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THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES



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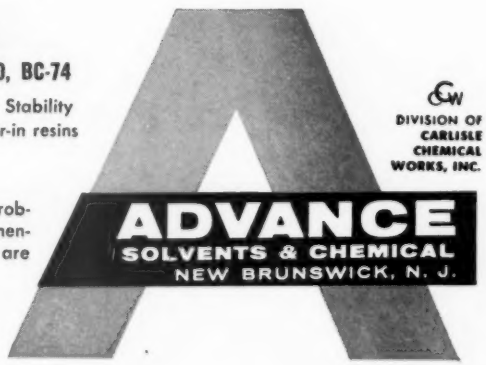

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**AUGUST 1956**

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(REG. U.S. PATENT OFFICE)

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOL. 46 AUGUST, 1956 NO. 9

NEXT ISSUE

Some problems encountered in the finishing of automobiles will be featured in the next issue of our publication. The author will discuss the problem of surface contamination in phosphate treatment, problems relating to undercoats, and problems arising from new finishes.

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MONROE ALTER
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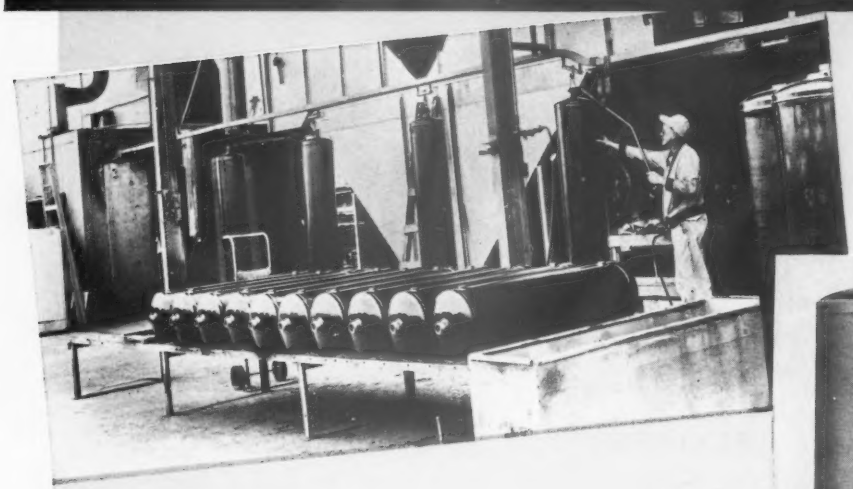

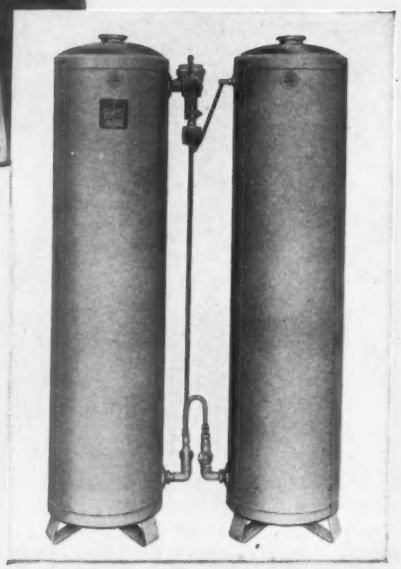

## Plastic coating guards water softener tanks against corrosion

## HERE'S HOW...

THE ROPER MANUFACTURING CORPORATION of El Monte, California, needed a tough, dependable anti-corrosion lining for tanks used in water treatment. They decided to test a promising coating formulated from Epon 1007 and supplied by the Trail Chemical Company of El Monte.

This Epon resin-based coating, applied to steel panels, easily survived severe tests for metal adhesion and thermal shock. Immersion tests showed that it resisted organic chlorides, detergents, salt spray and acids at both room and elevated temperatures.

Finally, two test panels were taken from an autoclave in which they had been held for two years. The first panel—coated with a high-quality porcelain—showed large rust spots, while the Epon resin-based coating on the other panel *was still intact.* Small wonder that Roper has now standardized on Epon resin-based coatings to line their water softener tanks. More than 30,000 tanks have been delivered, with no complaints to date.

Paint users are rapidly becoming aware of the many advantages offered by Epon resin formulations . . . excellent adhesion, resistance to abrasion and impact, ability to withstand extremes of heat, humidity and the attack of corrosive chemicals. Your Shell Chemical representative will explain how you can take full advantage of Epon resins in your paint and enamel formulations. Write for: "Epon Resins for Surface Coatings" and "Epon Resin Esters for Surface Coatings."

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# Editorial Comment

August, 1956

## The Perkin Centennial

QUITE by accident, William Henry Perkin synthesized the first dye, just one hundred years ago. In an attempt to synthesize quinine, Perkin's experiments yielded violet crystals. Pursuing the work further, Perkins was able to control the process and ultimately marketed the first synthetic dye, known historically as Perkin's Mauve.

This was the beginning of the synthetic dye industry, but more important, Perkin's discovery had a tremendous impact on the chemical industry, resulting in the development of innumerable new products that have contributed greatly to our modern way of life. Among these are pharmaceuticals, insecticides, plastics, resins, fibers, synthetic rubber, agricultural chemicals, photographic chemicals, perfumes, flavors, etc.

A celebration commemorating Perkin's discovery will be held during the week of September 10th at the Waldorf-Astoria in New York City. This event is sponsored by the American Association of Textile Chemists and Colorists under the direction of the Perkin Centennial Committee.

Twenty-seven leading technical, chemical and scientific societies concerned with the manufacture or application of color, and two United States Government Departments are taking part in this occasion. Of particular interest to the paint industry is the inclusion of the National Paint, Varnish, and Lacquer Association and the Dry Color Manufacturers' Association in this impressive list of participating societies.

A comprehensive color exhibit will feature the Perkin Centennial Celebration. This exhibit will be historical and educational in nature and will depict the story of dyes, where they originate and what they mean to our national and industrial economy. The proposed plan features a number of integrated parts and illustrates the historical background of man's attempt to color materials with natural dyes. The scarcity and high cost of available dyes obtained from nature is pointed up and leads to the discovery of mauve by taking the visitor through the gateway to a more colorful world, showing a framed setting of William H. Perkin at work in his laboratory.

Other exhibits will show the properties of today's syntehtic dyes and their uses in the home, fashion, and industry. Materials that are enhanced in beauty and appeal through color will also be exhibited. These will include fibers, paper, leather, plastics, paints, etc. Exhibits illustrating the different industries and their many products that have grown out of the dye industry have also been planned.

Another feature of the Perkin Centennial Week will be the presentation of several papers dealing with some aspect of color.

One-hundred years have passed since Perkin made his important discovery—a discovery which proved to be the cornerstone upon which the existing dye industry is built, and which resulted in countless chemicals and intermediates used in this modern age. It is fitting, therefore, that scientists and technologists lend their support in commemorating this important event.

# Now Dutch Boy BEN-A-GEL® is helping improve latex paints

Today, latex paints are booming.

Interior types are moving fast. Exterior types are being developed now to repeat this success.

BEN-A-GEL . . . the "Dutch Boy" gellant for water-based emulsions . . . is making unique contributions to *both*.

### Snaps up "whites," Snaps out colors in inside latex paints

BEN-A-GEL greatly improves pigment dispersion. Thus, with a given amount of pigment, you get brighter color in "tints," increased daylight reflectance in "whites." Better hiding power, too. And reduced pigment streaking, floating, agglomeration or settling.

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Find out how to improve *your* latex paints with "Dutch Boy" BEN-A-GEL. Write for folder and Data Sheet BG-1, "BEN-A-GEL in Latex Emulsion Paints."

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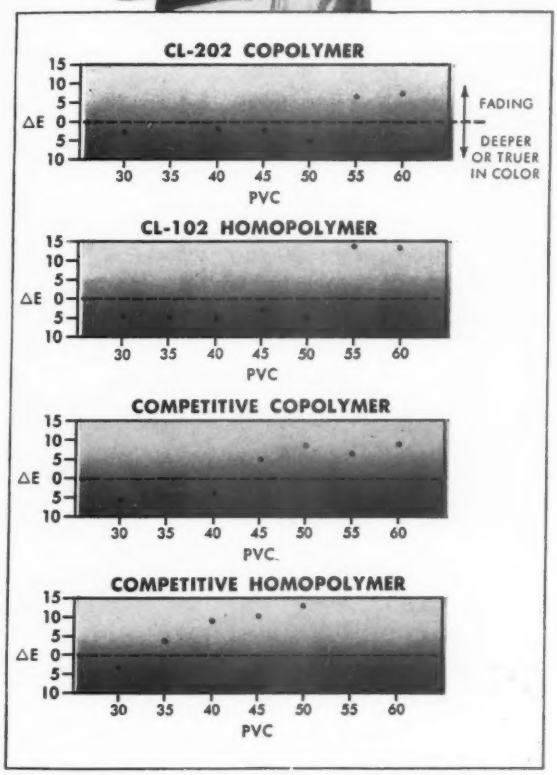
## accelerated weathering tests prove:

# CELANESE PVAc EMULSIONS GIVE YOU SUPERIOR TINT RETENTION




**EXTERIOR DURABILITY.** The above diagram illustrates the variations in tint retention obtained on identical paints formulated with fine vs. coarser particle size emulsions. These test paints, ranging in PVC from 30-60%, were made from a master pigment paste dispersion and let back with the test emulsions. The finished paints were tinted to a medium blue with an aqueous phthalocyanine blue dispersion and applied over asbestos cement panels. After Weatherometer exposure, the tri-stimulus value $\Delta E$ was plotted for each PVC. The value $\Delta E$ is the closest numerical representation of the color change apparent to the eye.

A study of the charts shows that *fine particle size* emulsions can be formulated at higher PVC's without sacrificing tint retention. The Critical PVC of both Celanese PVAc emulsions was greater than 50% *. . . higher than any emulsion tested!*

*Fine particle* size is the key to the superior tint retention of exterior polyvinyl acetate paints based on Celanese Homopolymer and Copolymer emulsions!

These facts were borne out in Weatherometer Tests on exterior PVAc paints ranging in PVC from 30-60%. All paints were identical in formulation except for the emulsion used.

*Fading at low PVC's* occurred in those paints formulated with ordinary *coarser particle size* emulsions after as little as 600 hours Weatherometer exposure. These same paints formulated with Celanese *uniformly fine particle size* emulsions showed *no evidence of fading* at PVC's up to 50%.

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- **Superior freeze-thaw stability**
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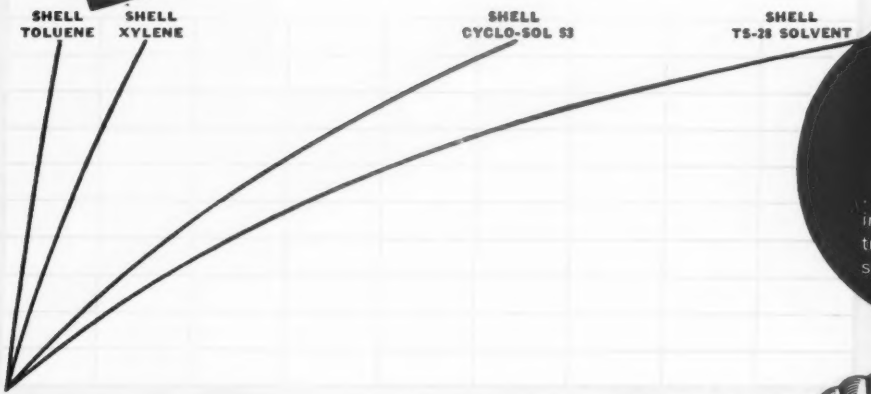


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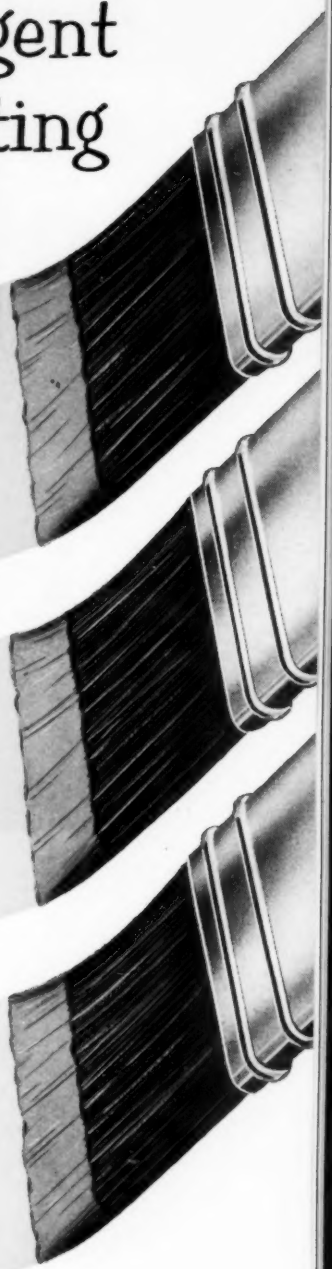

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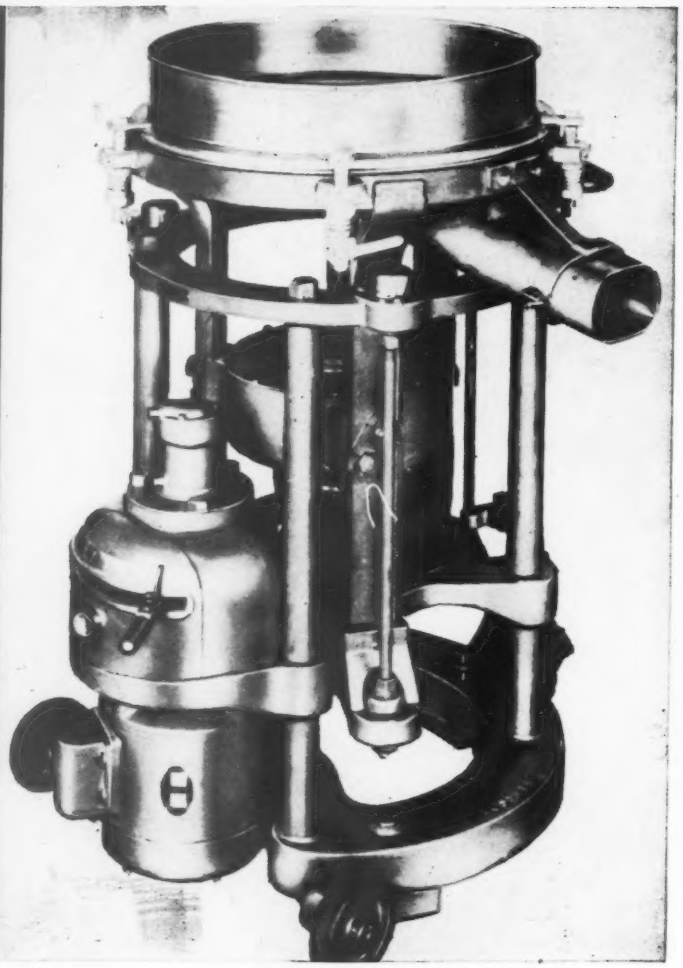

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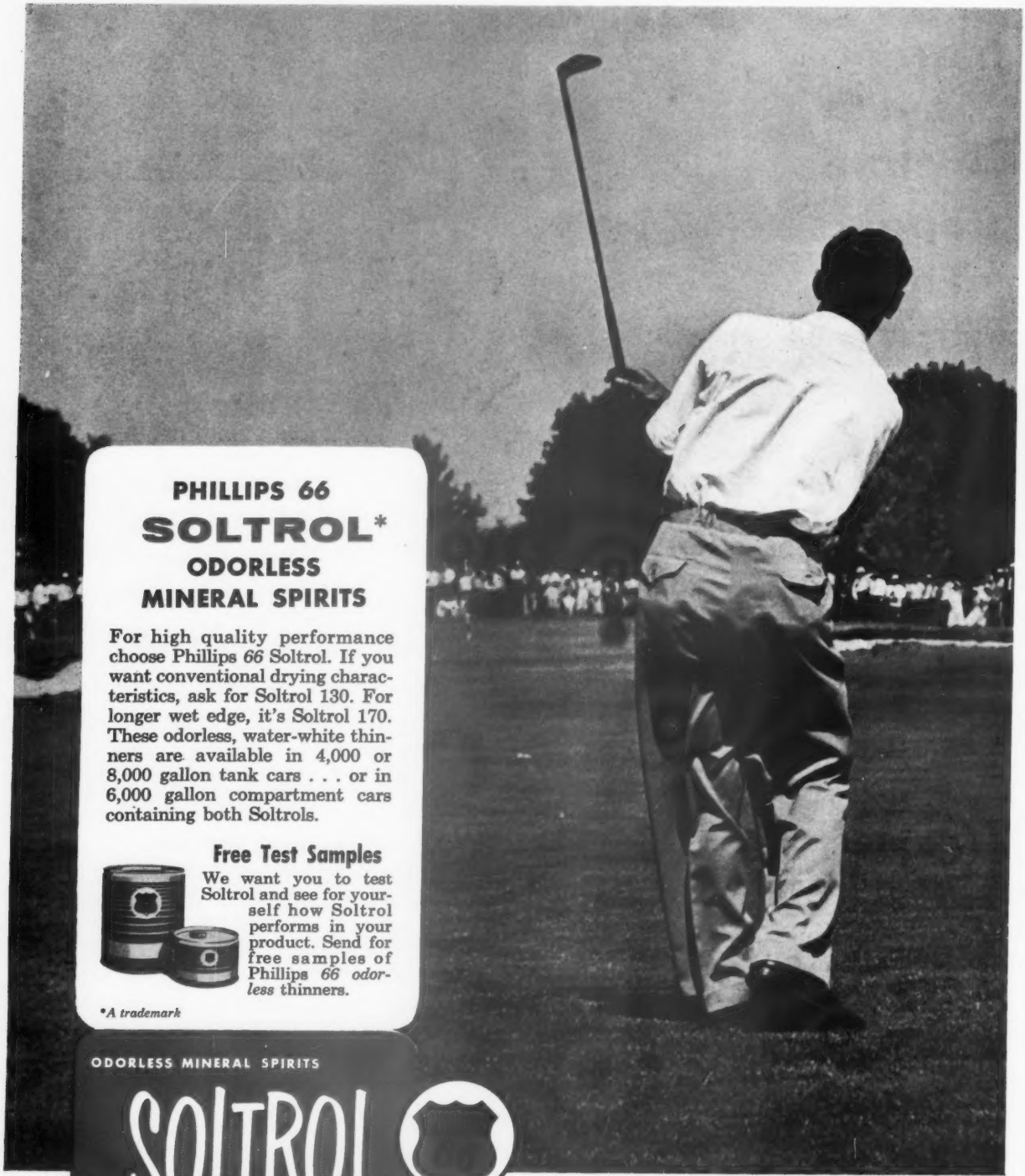

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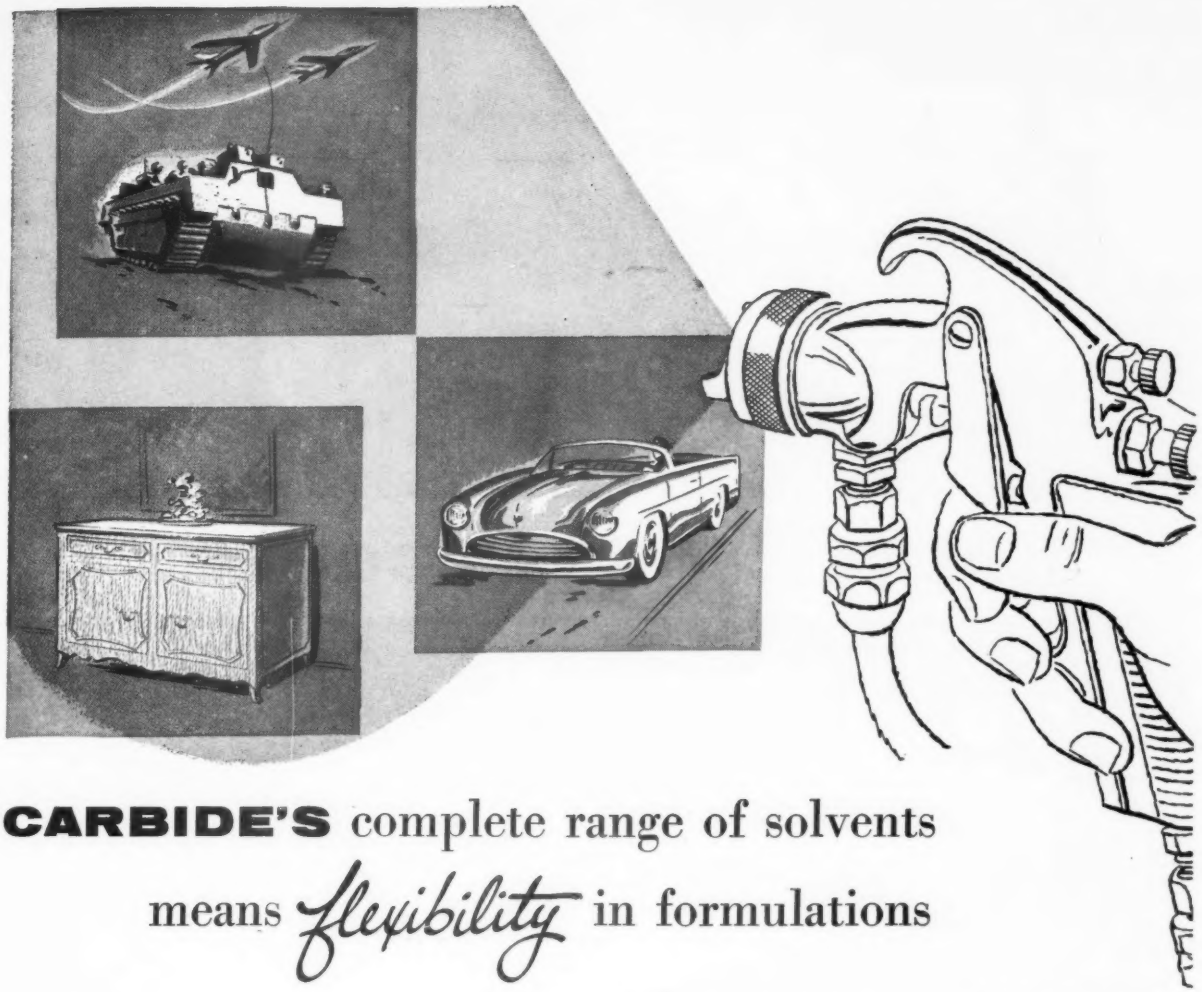

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# COATINGS FOR USE WITH CATHODIC PROTECTION

By
A. C. Elm*

**Organic protective coatings continue to occupy a prominent position in the fight against corrosion. Although cathodic protection is gaining in importance and is the preferred system of corrosion control in some cases, there is developing among corrosion and paint engineers alike an increasing appreciation of the need for the use of organic protective coatings in conjunction with cathodic protection for optimum results in the fight against corrosion.**

**Organic protective coatings, when employed with cathodic protection, are subject to electrolytic influences which tend to promote certain types of film failure. Foremost among these is blistering. This blistering occurs primarily over cathodic areas and is believed to be the consequence of the endosmotic transfer of water to the cathode surface coupled with the formation of alkali which destroys the bond between the coating and the substrate.**

**Reasoning that blistering could be avoided by making the paint film a part of the electronic branch of the corrosion circuit thus moving the cathode surface from the coating/substrate interface to the coating surface, it is suggested that electrically conducting paints, especially so-called zinc-rich paints, might prove to be especially well suited for use with cathodic protection. It is suggested that research be undertaken along these lines.**

THE world-wide cost of corrosion has been variously estimated at 5 to 6 billion dollars per year. There is no doubt that the stakes are high in the fight against corrosion. Organic protective coatings were among the first weapons and still are in the forefront in this fight against corrosion whose primary aim is to find the best combination of anticorrosion aids for a specific set of service conditions and at the lowest possible cost.

Anticorrosion knowledge has come a long way in the last 10 or 15 years, and the theories which have been formulated are of considerable help to the corrosion and paint engineers. Modern technology, however, is so complex that its problems are bound to be of a highly complex nature. There is no such thing as a general corrosion problem, and there is no one protective system of universal resistance to corrosion. There is a definite trend particularly in some rather specialized corrosion cases to tailor-make the anticorrosive system, giving due consideration to the specific corrosion conditions and the service requirements. Nevertheless, some basic principles have been evolved which can serve as guides to the protective coatings and corrosion engineers.

### Basic Principles

The electrochemical theory of corrosion in its simplest form and as it applies to the corrosion of iron or steel, states that when an iron surface is in contact with a suitable electrolyte iron enters the solution as ferrous ion. The electrons freed in this step travel through the metal to other areas of the surface where they enter into a reduction reaction such as the reduction of hydrogen ions derived from water to gaseous hydrogen or the reduction of oxygen. The point at which the ferrous ion enters the solution is called the anode, and the point at which electrons are consumed in the reducing reaction is called the cathode. The anode and cathode are finitely separated areas of the metal-electrolyte interface. The ferrous ions formed at the anode may further react there or may diffuse some distance away from the anode before they com-

*This paper was presented before the Division of Paint, Plastics, and Printing Ink Chemistry of the American Chemical Society at its 128th meeting in Minneapolis, Minn.

A. C. Elm is associated with the Research Dept., the New Jersey Zinc Co., Palmerton, Pa.

bine with hydroxyl ions to form ferrous hydroxide which then may be oxidized by oxygen dissolved in the electrolyte to hydrated ferric oxide, the well-known rust.

The corrosion reaction gives rise to the corrosion current which consists of two branches; namely, the electronic branch resulting from the flow of electrons from the anodic to the cathodic areas through the metal, and the electrolytic branch due to the migration of ions through the electrolyte. The reaction itself may be divided into the anode phase and the cathode phase. Neither can proceed to any extent without the other. Corrosion, therefore, can be prevented by preventing either the anode reaction or the cathode reaction, or by intercepting either the flow of electrons through the metal or the migration of the ions through the electrolyte. The flow of electrons through the metal cannot be prevented under the conditions being considered here, and the remaining three possibilities of corrosion prevention or control are usually resorted to.

There are two major ways of interfering with these three phases of the corrosion process. One consists of interposing a suitable barrier between the metal surface and its surroundings capable of completely interrupting the electrolytic branch of the corrosion current. The other involves impressing, from an external source, a potential upon the iron so that it becomes sufficiently negative, and positively charged iron ions will not be able to leave the metallic lattice. The former is accomplished by painting, while the latter is known as cathodic protection.

**Paint Protection**

Barrier coatings, in order to be effective as such, must be impermeable to moisture or oxygen or both. *J. E. O. Mayne* (14) estimated that the diffusion of water through paint films ranges from 190 to 1122 mg./cm.$^2$/yr. and of oxygen from 4 to 53 mg./cm.$^2$/yr. while the average rate of corrosion of steel which is 70 mg./cm.$^2$/yr. requires only 11 mg. of water and 30 mg. of oxygen. Therefore, he concluded that paint films are so permeable to water and oxygen that they cannot inhibit corrosion by exclusion of these agents.

*Kittelberger and Elm* (5,8,9,10,11) suggested in a series of publications dealing with various aspects of anti-corrosive paints that organic coatings inhibit corrosion by virtue of their high electrolytic resistance. Since then considerable evidence (1,14) in support of this viewpoint has been forthcoming. This then means that a paint coating ceases to function as an anticorrosive barrier when its electrolytic resistance is destroyed. This occurs rather frequently in practice when the continuity of the coating is broken by wide scratches and scars penetrating to the metallic substrate or by ruptured blisters baring the metal surface. When this happens, the bare area becomes the anode while the rest of the painted structure assumes the role of the cathode. In line with the differences in the relative areas, the current density at the anode surface is very high indeed so that the corrosion at the bare area proceeds rapidly often leading to perforation of the steel structure (8). To fill this gap in the fight against corrosion, cathodic protection was devised. For example, *W. L. Crosby* (3) stated that the protection of transformers installed in manholes under the streets of New York City is an especially difficult problem. The first step was to select the best possible paint system. Since installation of these transformers invariably resulted in damage to the paint coating and repainting, owing to the cramped conditions in the manholes was impossible, no paint coating gave protection for more than but a small portion of the full electrical life of the transformers. Therefore, cathodic protection was given consideration. Another case is described by *K. A. Spencer* (18). The first pipeline was laid in America in 1865. Today there are some 200,000 miles of pipelines, principally in steel. In spite of the use of paints and all types of other organic coatings and wrappings, corrosion occurred, and in the 1930's many companies were faced with extensive reconditioning or renewal of their pipeline systems at very high cost. Attention then turned to cathodic protection.

**Cathodic Protection**

As stated previously cathodic protection involves impressing upon the steel structure an e.m.f. sufficiently negative that the iron cannot leave the crystal lattice and enter the electrolyte solution which is in contact with it. The external current source may consist of: (a) rectifiers or generators, or (b) sacrificial anodes such as Zn, Al, or Mg.

The ability of metallic sacrificial anodes to protect iron against corrosion is determined by the position of the metal with respect to iron in the electromotive series. The current required for the protection of bare steel areas usually ranges from 1 to 15 milliamperes per square foot. For design purposes it is generally assumed to be from 3 to 5 milliamperes per square foot. The potential required to produce this current flow depends on the resistivity of the electrolytic path between the electrodes concerned. In most natural electrolytes the difference in the solution potential between zinc and iron is about 0.3 volt which *Morris Mote* (12) considers almost ideal for the purpose. Magnesium develops a potential, when coupled with iron, of 1.9 volts, permitting its use in places where the resistivity of the environment is relatively high. Aluminum which, according to its position in the e.m.f. series, yields a potential of about 1.2 volts when coupled with iron is not particularly useful for purposes of cathodic protection. Aluminum is polarized by a dense oxide film and does not furnish the required current. The use of generators or rectifiers as the source of the impressed e.m.f. is dependent upon the ready availability of the necessary power source and distribution systems. Which one of the possible cathodic protection schemes is employed in a specific application, then becomes a question of economics.

There may be cases where cathodic protection offers the best and most economical solution of the corrosion problem. A typical example is presented by underwater structures such as the permanently submerged portions of piers. They

are inaccessible for repainting and any paint coating applied before submersion can be counted on to give adequate protection only for a limited period of time which is but a small portion of the expected service life of the structure. Therefore, in this specific case it is more economical to rely on cathodic protection as the only means of corrosion control. The majority of the corrosion control problems, however, is of a less specialized nature, and the realization is growing among corrosion engineers that cathodic protection and anticorrosive paints are not competitive but supplementary, and that combinations of these two control systems offer the best and most economical weapon in the fight against corrosion. Thus, *Morris Mote* (12) estimates that the normal life of a bare pipeline might be two to three years and present a replacement cost of $1.40 per year per foot. A well-coated line has a life expectancy of seven years, making the replacement cost $0.60 per year per foot while a combination of coating and cathodic protection would increase the life of the pipeline to over 15 years and reduce the replacement cost to $0.30 per year per foot. As this trend develops further, the paint chemist can expect to be called upon more and more frequently to collaborate with the corrosion engineer in the design of specific corrosion control systems.

**Paint Coatings for Use With Cathodic Protection**

When paint coatings are used in conjunction with cathodic protection they are subject to electrolytic influences which may alter their behavior considerably. This point is strikingly illustrated in an article by *R. P. Devoluy* (4). In an investigation of the behavior of ship-bottom paints subjected to cathodic protection, he observed that paint systems which under other circumstances gave a very good account of themselves were, when used in conjunction with cathodic protection at current densities of 500 to 600 milliamperes per square foot, soon severely blistered or completely blasted off the test panels.

In a series of laboratory experiments involving the immersion in a suitable electrolyte of coated steel panels bearing a one square inch window in the center and coupled to a magnesium anode, *W. L. Crosby* (3) observed peeling in from one to 11 days depending on the type of coating. The peeling occurred first around the unpainted windows. The coatings were completely removed from the front of two of the test panels in 15 to 21 days. In the other tests, blisters formed first and increased gradually until up to 65% of the panel was covered. Similar results were obtained when, instead of the magnesium anode, a direct current source was used. With a current of 17 milliamperes or over per square foot coating deterioration started in one day. With a current of 0.5 milliampere it took four days for visible deterioration to occur. Subsequent deterioration was roughly proportional to the current. The unpainted areas showed rusting at the lower currents, but not at the higher currents. Cathodic currents of sufficient magnitude to protect steel at film breaks caused deterioration of the coating.

The behavior of paint systems when subjected to electrolytic influences has been extensively studied in the last ten years. *W. W. Kittelberger and A. C. Elm* (11) reported that the rate as well as the degree of water absorption and blistering are considerably increased when paint coatings immersed in sea water are subjected to an electrical potential gradient. About 90% of the water transported through the film surface under these conditions migrated under the influence of the current, and this migration was to the cathodic areas (6). Therefore, paint coatings intended for use in conjunction with cathodic protection must be especially formulated for the purpose, and the major defect to look out for is blistering.

Although blistering is not a new experience to paint chemists and in spite of the fact that it has occupied the attention of many investigators, no entirely satisfactory mechanism of blister formation has yet been formulated. For the purpose of this discussion it will suffice to start with the factual observation that the type of blistering of particular concern in connection with the phenomena under discussion here commonly occurs over cathodic areas.

The electrochemical reactions taking place at cathodic areas involve the discharge of hydrogen ions as gaseous hydrogen with a corresponding accumulation of $OH^-$ which make the electrolyte in the neighborhood of the cathodic metal areas strongly alkaline. The pH of the liquid within blisters formed on steel has been found by *Pass* (17) to be 10, while *J. C. Hudson* (7) reports a pH of 11. Alkalinities of this order of magnitude are high enough to contribute materially to the destruction of the bond between the coating and the steel surface. This weakening of the bond, coupled with the endosmotic movement of water to cathodic areas, may be assumed to be responsible for the blistering and peeling frequently observed when organic coatings are used in conjunction with cathodic protection.

Attempts to overcome this coating defect by vehicle formulation have not been as successful as had been hoped. Even the most water-resistant coatings are sufficiently permeable to permit the electro-endosmotic transport of enough water to cathodic substrate surface areas to cause blistering. Unfortunately, it appears, as the water resistance of organic coatings is increased, their inherent adhesion is decreased, and a solution of this problem by binder formulation alone seems to be, to say the least, very difficult indeed. However, theoretical considerations point a way toward a possible solution.

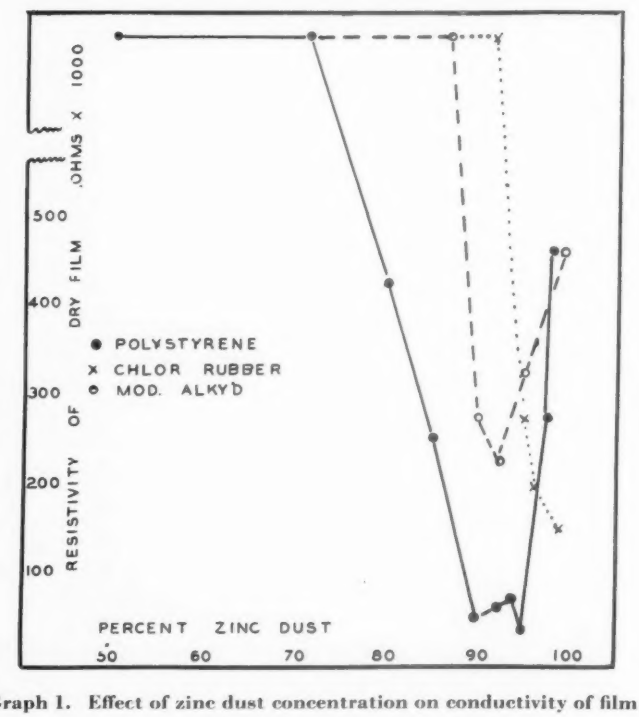
The seat of the difficulty is the cathode of the corrosion circuit. The cathode is that interface between the electronic and the electrolytic branches of the corrosion circuit at which the electrons, after traveling through the metal, reduce suitable ions contained in the electrolyte in contact with the metal surface. With ordinary paint coatings this cathodic interface is identical with the interface between the paint coating and the metal substrate. In other words, the paint coating is a part of the electrolytic branch of the corrosion circuit. If it were possible to make the paint coating part of the

| Pigment Concentration Per Cent | | Resistivity in Thousands of Ohms Per Square Inch | | |
|---|---|---|---|---|
| By Weight | By Volume | Dry Film | Under Tap Water | Under Salt Water |
| 100 | — | 23 | 30 | 24 |
| 95 | 79 | 18 | 2 | .0003 |
| 90 | 60 | 2 | 1 | .0005 |
| 85 | 48 | 12 | 8 | .007 |
| 80 | 40 | 18 | 7 | .01 |
| 75 | 33 | 1,990 | 165 | .3 |
| 70 | 28 | 3,323 | 657 | 9 |
| 65 | 24 | 3,323 | 759 | 26 |
| Clear Vehicle | 0 | 15,000 | 2,400 | — |

**Table 1. Effect of zinc dust concentration on coating resistivity.**

| Metal Substrate | Pigment Used in Paint | Potential Versus Calomel Electrodes After 23 Hours Immersion of Coated Panel in Water — Volts |
|---|---|---|
| Steel | Unpainted | −0.699 |
| Steel | Magnesium Powder | −0.597 |
| Steel | Aluminum powder (fine) | −0.600 |
| Steel | Zinc dust | −1.062 |
| Zinc | Unpainted | −1.053 |

**Table 2. Electrode potentials of coated steel panels.**




**Graph 1. Effect of zinc dust concentration on conductivity of film.**

(From A. Pass, J. O. C. C. A. 35.255, 1952)

electronic branch of the corrosion circuit, the cathodic interface at which the troublesome reactions occur would be moved to the film surface. The alkalinity generated at this point would be quickly diluted and flushed away before it could do serious damage to the coating. The bond of the film to the metal substrate would remain unaffected, and loss of coating adhesion should be practically eliminated.

Making the paint coating a part of the electronic circuit involves nothing more than making it electrically conducting and insuring good electrical contact with the metal substrate. This may be accomplished by pigmenting a suitable vehicle with a sufficiently high concentration of a metallic pigment, such as zinc dust.

In an effort to determine the minimum or optimum pigment concentration required for adequate conductivity, resistivity measurements were made with a series of steel panels coated with zinc dust paints approximately five mils thick and ranging in pigment concentration from 95% to 65% by weight. The results are shown in Table 1.

It may be concluded from these data that zinc dust concentrations of 80 to 90% by weight give films of miminum resistivity and good electrical contact with the substrate. The higher resistivity of the dry films containing over 90% zinc dust and of dry zinc powder itself is probably due to the formation of a relatively non-conducting oxide layer on the zinc dust particles exposed to the atmosphere owing to a deficiency of vehicle. It seems that at pigment concentrations of 90% and less the incorporation of the zinc dust in the vehicle serves to remove the normally present oxide layer from the particle surface and to insure good metallic contact. But at less than 80% pigment concentration, the zinc dust particles are separated from each other by a sufficiently thick layer of binder, so that the film resistivity rises rapidly, and a ready and unobstructed electronic path from the metal to the film surface is no longer assured. Similar results reproduced in Graph 1 were obtained by *A. Pass* (17).

(*Turn to page 98*)

# FATTY ACIDS FOR PROTECTIVE COATINGS

By
J. V. Lang*

SEVERAL generations have passed since fatty acids were first discovered by the French chemist Chevreul in 1813.

Since this early discovery, many research investigators have added numerous important discoveries, until in our present day there is available a wealth of information on the structure, reactions, uses and methods of production of these fatty compounds.

Fatty acids have been produced commercially for many many years. However, it has been only in the past quarter century that major developments have been made in this industry.

Similar changes have also taken place in the protective coatings industry. The use of fatty acids in coatings has rapidly increased until today they are important raw materials in this expanding chemical industry.

It is the purpose of this paper to give a practical outline of the techniques employed in the production of these fatty acids to meet the requirements of modern protective coatings.

The basic raw materials for the commercial production of fatty acids are natural fats and oils such as tallow, cottonseed, soyabean, coconut, linseed, castor, etc. Many of these oils have been familiar to the protective coatings industry from its inception.

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*J. V. Lang is associated with W. C. Hardesty Co. of Canada, Ltd.

### Oil Splitting

The splitting of these oils to produce fatty acids and glycerine may be carried out in many ways. If an oil or fat is allowed to stand in storage over a long period of time, natural enzymes and bacteria will perform this splitting action. In industrial processing, however, this is too slow and wasteful a method, and the most common techniques used are the Twitchell, autoclave and continuous methods. In the Twitchell process, fats are treated with sulphuric acid and a catalyst to obtain this splitting. The autoclave method employs pressure and heat in place of catalyst to obtain a speedy separation. The continuous method is carried out by passing water and fat counter-currently through a tower at high temperatures and pressures, which causes the chemical splitting instantaneously. Regardless of the method used to split these fats and oils, the end products are the same, fatty acids and glycerine.

For many years chemists were familiar with a very tough, insoluble, brittle resin which was obtained by reacting glycerine with phthalic anhydride. This resin, because of its insoluble characteristics in solvents, and its brittle nature, was of no interest as a protective coating. However, it was found that if a portion of the phthalic anhydride was replaced by fatty acids, the resulting resin became more flexible and had improved solubility in organic solvents and, if properly formulated, would produce an excellent protective coating. This mixture is familiar to everyone as it is the basic formulation for all of our present day alkyd resins.

### Fatty Acid Modifier

As natural oils are composed of glycerine and fatty acids, two of the main components of alkyd resins, it was natural that these were the first source of fatty acids as modifiers. In fact, natural oils are still the largest source of modifiers for alkyd resins. (In the coatings industry "modifier" refers to the fatty acids used to change the chemical and physical properties of the resin.)

Many changes have taken place in the protective coatings industry since the introduction of alkyd resins in 1930. Probably the largest influence has been the large demand of the automotive and appliance industries for quick-drying, durable finishes.

Prior to 1946 almost all cars were black. Since that time, the trend has been to a greater variety of lighter colors. In addition, mass production techniques require

greatly improved color stability, which, at times, must withstand several times the normal baking cycle without degradation.

Probably as many changes have taken place in the fatty acid industry as have occurred with protective coatings. A few years ago a fatty acid of light initial color was required, but today the modifier must be able to maintain its color when subjected to high temperatures for several hours. New techniques of processing have been developed, making it possible to tailor-make fatty acids of specific compositions for specific purposes.

When natural oils are used as modifiers for alkyd resins, there are several disadvantages. Practically all of these may be overcome by the use of alkyd grade fatty acids.

If the modifier is an oil, all its components must be utilized in the alkyd resin, even though some fractions may be highly undesirable. However, when a fatty acid is used, it may first be fractionated to remove any undesirable portions and the alkyd can then be formulated to contain only the desired fatty acids, and thus obtain improved resins.

**Selective Crystallization**

There are several methods of fractionating fatty acids. One of the most important methods of fractionating is by selective crystallization in solvent.

When an oil or fat is split into fatty acids and glycerine, the fatty acids obtained have the same ratio of oleic, linoleic, linolenic, stearic, palmitic, etc., as in the whole oil. Composition of the various fatty acids present in most common oils and fats are available. If these fatty acids are dissolved in a solvent such as methanol, acetone, hexane or other suitable solvent, and cooled to temperatures of 0 degrees centigrade or lower, the saturated fatty acids having higher melting points, such as the stearic and palmitic acids, will crystallize and precipitate out and may then be segregated by filtration. The solvent can then be stripped from these fractions and fatty acids of changed composition are obtained. By varying the type of oil, the percentage of solvent, the operating temperature, or any of several other variables, it is possible to vary the composition to obtain a specific mixture.

Examples of products of this type, and where these could be used would probably better illustrate this technique.

Soyabean oil contains approximately 6.5% linolenic acid. It also contains approximately 50% of linoleic acid from which it obtains almost all of its valuable drying characteristics.

A manufacturer producing an alkyd from soyabean fatty acids may wish to obtain the typical characteristics of drying time, hardness, flexibility, etc., but may also desire better non-yellowing properties. To obtain the maximum non-yellowing it is desirable to obtain a fatty acid composition very similar to soya, but containing no linolenic acid.

Looking over the composition of natural oils, you will see that the possible choice for this purpose is limited. In fact, there is no oil which will give fairly close composition of the type desired.

If you look at cottonseed oil, you will note that it contains no linolenic acid, but unfortunately has only 41% of linoleic acid, while we require at least 50% to maintain our dry. Also, the high saturated content of cottonseed would certainly be undesirable.

However, if cottonseed oil is made into a fatty acid and the saturated portion removed, you can obtain a fatty acid with about 55% linoleic acid which gives almost the identical characteristics of a soya, but with no linolenic acid present.

Another example of this type of fractionation would be to produce a fatty acid of similar characterisitics to linseed fatty acids, but with a reduced linolenic content to obtain better color stability. You will note from the chart that linseed fatty acids contain approximately 47% of linolenic acid and 24% of linoleic acid. To obtain the same drying characteristics would require a very high linoleic acid content with as low linolenic acid as possible. Soyabean fatty acids contain a combination of linoleic and linolenic acids of about 57%. By similar treatment, by selective crystallization it is possible to boost this composition to approximately 70% of these drying acids, giving drying properties almost equal to linseed, but with much lower linolenic content, probably less than 9% linolenic acid. Fatty acids with iodine values as high as 160 have been produced from soya by this method.

This process can be used with several other fatty acids equally well to give a complete range of fatty acids with enriched unsaturated portions.

**Fractional Distillation**

Another process for the segregation of fatty acids is fractional distillation. As this method is dependent on the variation in boiling points between fatty acids of varying chain lengths, it can not be used for the separation of fatty acids of the same chain length, such as stearic acid, oleic acid. Linoleic acid and linolenic acid, which are all 18 carbon atoms in length. However, it is of use for oils having fatty acids of varying chain lengths, such as found in coconut and palm kernel oils. The most common products from this form of fractionation are enriched grades of lauric acids. Lauric acids with purity of over 90% are available from this process.

It may be of interest at this point to mention the methods of control which are used during processing to determine the composition of these fractionated products. As the composition must be rigidly controlled to obtain consistent characteristics when used in a resin, the normal tests for fats and oils such as acid number, saponification number, iodine value, titre, etc., must be complemented by additional controls. In the case of unsaturated fatty acids from solvent separation, the percentage of linoleic, linolenic and conjugated acids are determined by ultra violet spectrophotometric analysis. In the case of fractional distillation, the components must be determined by an analytical distillation which is normally carried out using the methyl esters of the fatty acids.

**Hydrogenation**

We have covered to this point several methods of varying fatty acid compositions. There is another process which is used to a

limited extent. This process is hydrogenation.

The best example of this application is in its use with coconut fatty acids. You will note that coconut contains approximately 5.7% oleic acid and 2.6% linoleic acid. When it is desirable to produce a non-drying resin for a white bake enamel, removal of the 7% to 8% of unsaturated fatty acids will give added color stability in the finishes. By hydrogenation, the reactive, unsaturated portion is converted to stearic acid, giving the coconut fatty acids increased stability over the natural product.

As color is one of the most important properties in modern finishes it is essential that fatty acids of the lightest possible color be employed. It is for this reason that all fatty acids for alkyd resins are distilled to obtain the desired color. In fact, most fatty acids for alkyd purposes receive at least two distillations. Fatty acid distillation for this purpose does not alter the composition to any appreciable extent, except for the removal of impurities such as protein, color bodies, and other non-fatty materials which are generally found dissolved in natural fats and oils. Distillation is one of the most important fatty acid processes in relation to the protective coatings industry. The removal of impurities not only gives better initial colors, but also gives greatly increased color stability for critical applications.

**Fatty Acid Distillation**

Possibly a brief description of fatty acid distillation will further clarify its use in the production of alkyd fatty acids. There are several types of distillation processes, varying from continuous to batch processes. However, they all accomplish the same general results. Fatty acids are heated under very high vacuum to temperatures between 400 and 500 degrees F. and the vapors are condensed, yielding distilled fatty acids and leaving behind the residue of foreign material, known as stearine pitch. Normally, fatty acids are slightly fractionated to remove any light or volatile ends, which improves the odor of the finished product.

When a fatty acid has received a double distillation of this type, a very high quality product is obtained which is usually superior to any commercial oils.

There is another reason for the distillation of fatty acids which enters into the economy of these processes. It permits the use of lower grades of oils and fats, many times the by-products of the edible oil industry. The purification obtained by distillation yields a top quality fatty acid, suitable for light colored finishes, and, at a very economical cost. This is of particular importance when oils are priced at a high level, a situation which has occurred many times in past years.

**Use in Coatings**

We have outlined the main processes of manufacturing fatty acids for protective coatings and we would now like to enlarge on a few of the principal uses in the protective coatings industry.

The largest volume of fatty acids in protective coatings is used for the production of alkyd resins. Despite the fact that the largest percentage of alkyd resins produced in Canada use oils as modifiers, it is generally recognized that the most uniform products are obtained when fatty acids are used as modifiers.

We have already pointed out that when an oil is used as a modifier all of the components of that oil must be used in the resin. One of these components of the whole oil is glycerine. With the introduction in recent years of so many new polyalcohols, such as pentaerythritol, sorbitol, glycols, etc., it is many times undesirable to have glycerine present in the mixture. Fatty acids permit the use of any polyalcohol desired.

As you know, the fatty acid industry is a large producer of glycerine, which is utilized in many ways in the coatings industry.

Natural oils, before they can be used in an alkyd resin, must first be reacted with additional polyalcohol to form the monoglyceride. This cooking requires several hours before the actual resin cook may be started. Fatty acids may be charged with the phthalic anhydride and other ingredients into the kettle and the cook started without any pre-cooking whatsoever. This enables a manufacturer to obtain higher production without additional outlay for equipment.

When alkyd resins are manufactured with fatty acids in an open kettle this shorter cooking time produces an amazing difference in the colors of the finished resins. In open kettle work, air normally is in contact with the oils, regardless of how efficient a blanketing system of inert gas is employed. Every hour that this resin must be cooked causes very severe darkening. An extra two to three hours at cooking temperatures usually results in a very dark resin despite the color of the original products which are employed. However, as fatty acids react more quickly, and can also be produced with added heat stability, it is possible to produce resins by open kettle processes which are suitable for light pastel colors. Therefore, if resins are required for any purpose other than very dark colors, it is essential that fatty acids be employed when this technique is used. When alkyd resins are manufactured in a closed kettle, using fatty acids, even better results are obtained.

In newer type resins such as the epoxies, it is necessary to use fatty acids exclusively as the modifiers, as oils cannot be employed. Epoxy resin uses have grown greatly in the last few years due to their outstanding properties in protective coatings.

Fatty acids are used in a multitude of applications in the protective coatings in more or less secondary applications. Examples of these are the metallic soaps produced from fatty acids as dryers, such as zinc, lead, cobalt, calcium, and manganese oleates. Also the metallic soaps, calcium, aluminum, and magnesium stearates are used as gelling agents, suspending agents and flatting agents in the production of coatings.

Synthetic drying oils produced with fatty acids have shown many interesting properties and of recent years have found many new uses, and will probably continue to grow as the demand for new and different types of coatings are required.

Fatty acids are also used in the production of many plastics which

(*Turn to page 102*)

# COLLOIDALLY DISPERSED CARBON BLACK

By
Gordon Cook*

COLLOIDALLY dispersed carbon blacks, available in most common vehicles and resins, provide compounders with this invaluable black pigment as a complete, colloidal dispersion that can be handled as masterbatches with the cleanliness of white pigments. These quality dispersions are the thoroughbreds of the trade and reflect the years of experience of *Columbian Carbon Company*, whose chemists pioneered carbon black dispersions almost a half century ago.

Furthermore, with ordinary care, the colloidal character of the predispersion is maintained in the final product. (The importance of this will be recognized by anybody who has had experience in "grinding" dry blacks.) Liquid colloidal dispersions, for instance, can be introduced into liquid vehicles with no more trouble or equipment than simple stirring. Colloidal dispersions in chip form need only be softened by solvents for mixing, and then rapidly yield finished coatings that are far better dispersed than the usual "fine" grinds. For plastics, the chips can be tumble-mixed with the uncolored natural medium and then extruded or molded in the usual manner.

**Importance of Dispersion**

Perfectness of dispersion is particularly important with carbon black because of the extreme fineness of its particles and hence the enormous area of particle surface that must be wetted by the vehicle. Particles of the most used color blacks fall in the size range of 9 to 30 millimicrons diameter, corresponding to areas of particle surfaces of roughly 10 to 31 acres per pound. To secure perfect colloidal dispersion of such fine particles requires, in effect, that the vehicle be evenly spread over surfaces of these magnitudes, an operation necessitating the skillful application of strong forces and high energy. Only when this is done well—practically impossible in most plants,—can the product utilize the full values of its carbon black content. Therefore, if a complete colloidal dispersion is not attained, the product will never get full

*Courtesy Columbian Carbon Co.*

**Predispersions of carbon black in a variety of media provide colloidally perfect masters for introducing black cleanly and efficiently into paints, enamels, lacquers, plastics, and other industrial products.**

*Mr. Cook is associated with the Columbian Carbon Co., 380 Madison Ave., New York 17, N.Y.

development of depth of blackness and gloss.

**Advantages**

In almost every case the desired jetness and gloss can be better formulated into the finished product by using a smaller amount of black in a colloidal dispersion than would be required if dry carbon black is ground directly into the product. This effects a further saving—in addition to that realized by avoiding heavy grinding—that gives the user of predispersions a better product, usually without raising his overall costs.

Furthermore, colloidal predispersions of carbon black are dustless. Hence, they can be used anywhere around the plant without requiring the working area to be shut off from other operations involving light colors. Indeed, the old practice of working black only on designated days with general plant cleaning afterward, can be eliminated and replaced by simple cleaning of units used in contact with the black mixes. Also, as any formulator knows, carbon black, although it is one of the most widely used of all pigments, can cause some unexpected and dismaying variations in tone and gloss. Predispersions, where made by people who understand blacks, go a long way toward correcting these problems before they get started.

**Processing Techniques**

Dispersions in nitrocellulose produce excellent industrial and automotive enamels. Two methods are employed to convert the initial dispersion or master batch into the finished enamel. A preferred single-stage process extends the master-batch with nitrocellulose solution to give a brilliant enamel while a two-stage process yields an enamel, direct, without the addition of more nitrocellulose.

In the two-stage process, the dispersion chips are softened in a mixture containing both non-solvents and solvents for nitrocellulose, but not enough to dissolve the chips. When softening is complete, more solvent is added to complete the solution. For example, Coblac Industrial 7.2 parts, Toluene 19.0 parts, and butanol 4 parts are introduced into a tank with an agitator. Slow agitation is started, and ethyl acetate 2.5 parts is added. After an hour or so when the chips are found to be completely softened, ethyl acetate 3 parts and butyl acetate 9.2 parts are added with somewhat faster agitation. When solution is complete, other desired ingredients are added.

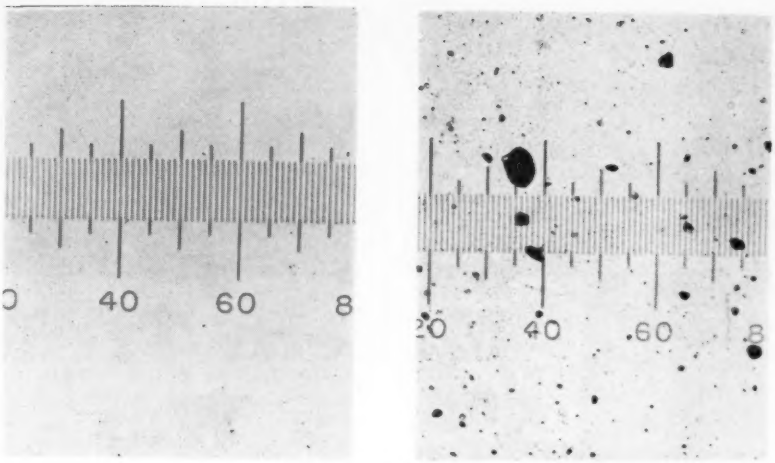
In the single-stage method, all the ingredients of the finished product except the black chips are mixed into a clear solution. Then the chips are added slowly with continued agitation. This simpler method is generally preferred, and, with care, will give a lacquer equal to that obtained by the two-stage method.

These two methods are general, and can be readily adapted to the various applications of other colloidal dispersions. For instance, Covarnishblaks (dispersions of carbon blacks in terpene resins) readily dissolve in oleoresinous varnishes, resin solutions, and hydrocarbon solvents by simple stirring. The Covinylblaks (dispersions in vinyl resin) are compounded into plastics along with the other ingredients in a two-roll mill, a Banbury or an extruder. For coatings, they are easily soluble in ketones or mixtures of ketones and aromatics. Costyreneblaks (dispersions in polystyrene) give excellent jetness, economically, in styrene molding products. Coethloblaks (dispersions in ethyl cellulose) are readily dissolved in the usual solvents for ethyl cellulose and are introduced into lacquers and other products in solution.

Aqueous colloidal dispersions of carbon black are convenient for addition to any mixture containing water. Latex paints, Portland cement mixes, and synthetic fibres are some of their largest uses. Various formulations and several grades of black are available in most of the common vehicles and resins used today, making a dispersion available to almost any type of formulator. Also, some of the best carbon black technicians in the country stand ready to help with formulating problems.

Thus, in summary, colloidal predispersions of carbon black:

1. Save labor;
2. Save power;
3. Save equipment;
4. Give better products;
5. Allow more efficient uses of plant space;
6. Reduce time and labor of clean-up; and thus
7. Reduce overall costs of product.




*Photos courtesy of Columbian Carbon Co.*

**A perfect dispersion of carbon black looks uniformly light gray when viewed through a light microscope, as in left photomicrograph. Even the finest color blacks will not give full jetness unless they are completely dispersed. If you can see aggregates of carbon particles with a light microscope as in right photomicrograph, the dispersion is poor. (Each scale division shown above is 7.04 microns).**

# Modern Trends in Wax Formulations

By
Kurt J. Wasserman*

WAXING of floors has been found to be a practical and satisfactory method of protection and maintenance. This is not a profound statement, nor a recent startling conclusion. It is simply a fact. Floor surfaces have been protected with wax for centuries. Parketry floors in France were kept lustrous with wax in the year 1500[1]. It is said that servants bound their feet in cloth and skated up and down the floors to bring up the desired lustre. The method of buffing has changed radically, but throughout these years buffing type waxes were used. It was only as recently as two decades or so ago that self-polishing Carnauba emulsions were first offered as protective coatings. Since that time, and particularly in the last decade, wax emulsion technology and floor finishes have progressed rapidly. Today, "Dry-Bright" finishes are economically of far greater importance than solvent-based or buffing type wax products.[2] Because of this, the author will discuss self-polishing formulations and wax emulsions to the exclusion of solvent systems.

The product development chemist today has a greater and more diversified group of raw materials to choose from than ever before. Time-honored raw materials have been supplemented, or in many cases, replaced by new raw materials.

Let us examine the basic components of a self-polishing wax. They are as follows:

a. Self-polishing base, plus emulsifier system
b. The leveling additive
c. Auxiliary additives

Let us discuss the component parts individually.

### Self-Polishing, Emulsifier Types

Carnauba wax was, and in some cases, still is, the primary wax in the base. The addition of straight or oxidized microcrystalline waxes and wax soluble and compatible resins is, of course, now in common use. The local wax supplier in many cases preblends the soluble resin with either Carnauba wax or the oxidized microcrystalline wax, in the proportion which the customer desires. Wax compatible synthetic resin extenders have been covered in detail in a recent article by Kroner.[3]

Other waxes, of course, can be used in the base, with good results. A recent addition to the natural waxes, is that of sugarcane wax. Some of the former I. G. emulsifiable waxes are again available in the American market for possible use in the wax base. Other recent types of products are the co-oxidized microcrystalline-polyethylene blends.

Among the completely new raw materials available for use in the base, two types seem to hold outstanding promise. They are the hard emulsifiable Fischer-Tropsch waxes,[4] and the emulsifiable low molecular weight polyethylenes.

The emulsifiable Duroxon J-324 is an outstanding example of a Fischer-Tropsch wax which has a great utility in the polish field. It is very hard, has a high melting point, light color and low melt viscosity. A simple basic emulsion

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*Mr. Wasserman is associated with Dura Commodities Corp., New York, N. Y

utilizing this wax is given in Table I.

**Basic Duroxon J-324**
**Fischer-Tropsch Wax Emulsion**

| | |
|---|---|
| Duroxon J-324 | 100 lbs. |
| Oleic acid | 10 lbs. |
| Morpholine | 15 lbs. |
| Water | 725 lbs. |
| | 850 lbs. |

**Table I**

The above emulsion can be processed by either the wax into water or the water into wax method, with the instantaneous method being preferable for the latter procedure. It is almost transparent and gives a glossy film which has outstanding buffability characteristics. It will be noted that a low percentage of emulsifier is required to disperse Duroxon J-324.

The emulsifiable polyethylenes likewise merit consideration in the wax base. They are tough materials with good non-slip properties. A basic emulsion of one grade, AC polyethylene No. 629 is given in Table II.[5]

**Basic Polyethylene Emulsion**

| | |
|---|---|
| AC polyethylene No. 629 | 100 lbs. |
| Oleic acid | 20 lbs. |
| Morpholine | 20 lbs. |
| Water | 710 lbs. |
| | 850 lbs. |

**Table II**

In spite of the fact that the melt is viscous, a high solids content of a low viscosity emulsion is readily attainable.

The manufacturer states that the wax to water method is preferable because of possible difficulties arising by using convential techniques.

One can use Duroxon J-324 with the emulsifiable polyethylenes with excellent results. The melt is fluid, emulsifer requirements are low, and it is even possible to process the emulsion by the "instantaneous water to wax" technique. See Table III.

With these high melting point wax-like materials, it is important to recognize that their higher melting points require higher processing temperatures than natural and microcrystalline waxes.

**Combined Polymer Emulsion**

| | |
|---|---|
| Duroxon J-324 | 75 lbs. |
| AC polyethylene No. 629 | 25 lbs. |
| Oleic acid | 10 lbs. |
| Morpholine | 15 lbs. |
| Water | 725 lbs. |
| | 850 lbs. |

**Table III**

The industry owes a good portion of its progress to the advent and use of amine soaps. These highly efficient emulsifier systems have made it possible to disperse many different types of waxes, polymers and resins. The type of emulsifier system used depends normally upon special properties required in the polish film, such as water resistance and removability characteristics. The ratio of emulsifier system to wax base is usually determined by the ingredients incorporated in the wax base, and is accordingly constant for such a base. However, this, too, can be varied, according to the end product desired. For example, if the emulsifier ratio is increased to a certain percentage with some raw materials, an almost transparent dispersion will result. Likewise, if the ratio of emulsifier systems is very low, a turbid dispersion will be the end result. Examples of such emulsions are given in Table IV.

The highly translucent emulsion would have utility in "clear floor finishes" to plasticize the resinous content.

In the alkaline portion of the emulsifier system, we have in common use today the alkanolamines, including 2-amino-2-methyl-1-propanol, morpholine and other amines which have been recommended from time to time. Inorganic alkalis such as borax, ammonia, caustic soda and caustic potash are usually auxiliary aids. A highly efficient amine which has recently become available is 3-methoxypropylamine. Its volatile characteristics are claimed to be similar to morpholine, and films with 3MPA possess excellent water resistance.[6]

In order to compare their action, note the data in Table V.

You will note that 40% less emulsifier was required when utilizing 3MPA, and the emulsion was slightly more translucent than the one with morpholine. Costwise there is a savings of approximately 3c/gallon for the 850 lbs. or 100 gallons of emulsion.

The use of nonionic emulsifiers in conjunction with waxes has been recommended from time to time in the literature of various emulsifier manufacturers. Their use, while subject to criticism in regard to their water sensitivity, does however, offer attractive possibilities in utilizing certain raw materials which cannot be easily used with the conventional anionic emulsions, due to imcompatibility or stability problems. We shall refer to a

| | "A" (Transparent Emulsion) | "B" (Turbid Emulsion) |
|---|---|---|
| Duroxon J-324 | 100 lbs. | 100 lbs. |
| Oleic acid | 15 lbs. | 7½ lbs. |
| Morpholine | 20 lbs. | 10 lbs. |
| Water | 715 lbs. | 732½ lbs. |
| | | 850 lbs. |

**Table IV. Examples of transparent and turbid emulsions**

**Comparison of 3-Methoxypropylamine and Morpholine In Emulsifying Duroxon J-324**

| | | | |
|---|---|---|---|
| Duroxon J-324 | 100 lbs. | Duroxon J-324 | 100 lbs. |
| Oleic acid | 10 lbs. | Oleic acid | 7½ lbs. |
| Morpholine | 15 lbs. | 3MPA | 7½ lbs. |
| Water | 725 lbs. | Water | 735 lbs. |
| | 850 lbs. | | 850 lbs. |

**Table V**

specific example when we cover the subject of "Auxiliary Additives".

**Leveling Additives**

Before the advent of the alkali soluble synthetic resins, natural resins such as shellac and Manila loba gum were in common use. As a matter of fact, they still are in common use. Despite the excellent leveling properties of the alkali soluble synthetic resins, none seem to possess the toughness of the natural resins. From time to time, other leveling additives have been recommended. These have included casein derivatives, minute additions of surfactants, and others. In conventional anionic systems, it has also been recommended that small proportions of ammonia soluble polyvinyl acetates be used in order to increase somewhat the viscosity of the emulsions and help them stay put after application on a floor surface. Certain organic plasticizers have definite leveling effects, but it is cautioned that their use leads to stability and film property problems. The use of alkali soluble synthetic resins and natural resins still prevails to a large extent because of their excellent leveling and gloss producing qualities. The alkali soluble resins and their use recently have been detailed in the literature.[7]

When the usual proportions of a wax emulsion and a resin solution are reversed, we obtain the high resin type of floor finish. In this case the resin, while contributing leveling properties, is not merely an additive. It is the base. These products are featured by outstanding gloss, excellent slip-resistance and scuff-resistance, as well as lack of buffability. The resinous floor finish, at the present time, predominates in sales to the housewife. The resin in common use is shellac, and attempts to find a substitute synthetic alkali soluble resin for it in this type of product have been almost totally unsuccessful. The excess use of alkali soluble synthetic resins in conjunction with shellac would usually tend to give a product which would easily scratch, and worst of all, under certain conditions, would tend to powder badly. Many preparations of this nature, furthermore, are rather difficult to remove completely from the floor, especially after a lapse of time. A very recent trend has been the incorporation of certain polymer latices in high resin dispersions.

This then, leads us to our next component part of a floor finish, namely, the use of auxiliary additives.

**Auxiliary Additives**

A comparatively new, rapidly growing and important trend is the inclusion of polymer dispersions in floor finishes. Their use in protective surface coatings of all types is now widespread and has already revolutionized the paint industry.

At this point, as a suggested guide, it might be appropriate to clarify and classify various types of synthetic resins and polymers which can be used, and are being used in floor finishes. (See Table VI).

The following reasons have been advanced at various times for adding polymers to floor wax compositions.

1. To provide anti-slip properties
2. To reduce cost
3. To improve emulsion color
4. To improve water resistance
5. To reduce tack, and subsequently dirt retention
6. To improve heat and freeze stability
7. To increase hardness of softer waxes
8. To improve gloss
9. To provide film support and added flexibility
10. To improve wearability of the floor wax
11. To provide ease of removability of the floor finish when required

As with other additives, dispersions of these polymers must be of a type which will not coagulate the wax or be coagulated themselves when mixed with, for example, the self-polishing base. Many commercially available dispersions meet this requirement. A dispersion should be neutral or negative in charge. The continuous phase is water, and solvents should not be present. Since the latices are colloidal systems,

**A Suggested Guide To Synthetic Resins and Polymers For Use in Aqueous Floor Finishes**

| | |
|---|---|
| 1. Synthetic Resins | |
| A. Wax soluble | e.g. Durez 219, Piccopale 100, 85, 70 |
| B. Alkali soluble | e.g. Shanco L-1001, Amberol 750 |
| 2. Aqueous Polymer Dispersions (Latices) Includes modified copolymers | |
| A. Acrylic | e.g. Rhoplex series |
| B. Polystyrene | e.g. Lustrex X-600, X-601, X-620, Ubatol U-2001 |
| C. Polyvinyl acetate | e.g. Darex polymer Y |
| D. Polyvinyl chloride | e.g. Geon 652 Latex |
| E. Styrene-butadiene | e.g. Pliolite Latex 150 |
| 3. Alkali Soluble Polymers | |
| A. Polyvinyl acetate | e.g. Vinac ASB-10, Elvalan |
| B. Styrene | e.g. Lustrex X-810, X-820, X-821 |
| 4. Hydrocarbon Polymers (Wax-like) | |
| A. Fischer-Tropsch Mineral Wax | e.g. FT 200, FT 300 |
| B. Polyethylene | e.g. AC Polyethylene No. 6, Epolene N. |
| 5. Emulsifiable Hydrocarbon Polymers (Wax-like) | |
| A. Fischer-Tropsch wax | e.g. Duroxon C-60A, J-324, H-110, H-111 |
| B. Polyethylene | e.g. AC Polyethylene No. 629, 729, Epolene E. |

Promising new synthetic materials, when commercially available can, of course, be added to the suggested guide.

**Table VI**

the basic principles governing colloids must be observed in their application.

The pH at which the polymer emulsion is supplied or adjusted is a serious consideration in formulation. Some polymers in aqueous systems are subject to a downward pH drift. A pH drift can easily result in instability of the final product. Polymer dispersions, when blended with wax dispersions, should have approximately the same pH since a wide difference in pH may cause coagulation or "throwing out" of other ingredients. Most latex systems are sensitive to freezing, and it is suggested that only those claimed to be free of freeze-thaw instability be considered. The deficiencies of certain latices for use in floor waxes have been covered in detail in the literature.[8]

Polymers can be used in high-wax, high-resin or in high-polymer formulations. Some latices are sold pre-plasticized while others must be combined with plasticizers before using them in floor wax formulations. In some cases it is possible to utilize the basic wax emulsion system to plasticize the polymer dispersion.[8] This is especially true if the polymer is to be used in small quantities and not as the main ingredient of the formulation.

Of interest have been modified polystyrene latices which have been claimed to be designed particularly for the floor wax industry. These ultra fine particle size dispersions possess excellent compatability characteristics with most raw material components of a floor polish. The use of one of the polystyrene dispersions has been detailed by Perry and Sweet.[8]

Alkali soluble polyvinyl acetate films in particular appear to possess superior toughness. It is felt that they show excellent promise in "high-polymer-low-wax" types of products. Laboratory tests indicate that this type of finish compares favorably to the high shellac type of resinous finish. The following formulation is offered as a basic one to show how this polymer can be successfully incorporated with an emulsifiable Fischer-Tropsch wax, Duroxon H-111, by means of a nonionic emulsifier.

As indicated in Table VIII the polymer floor finish as shown in Table VII compares favorably with the shellac type of product. Its gloss, while satisfactory, was not as high as the shellac film. The leveling properties also were considered good though not quite as good as the natural resin based product. In all other respects, the polymer product was rated as equal or superior to the shellac product.

Colloidal silica has been, and still is, being used to impart slip-resistant properties to wax emulsions. However, when properly formulated, the use of some of the polymers listed results in products possessing outstanding slip-resistance, as well as film-forming and buffability characteristics.[9]

Our final formulation shown in Table IX shows a self-polishing, highly buffable floor finish possessing excellent anti-slip properties.

This formulation is indicated to be good for heavy duty maintenance applications. It is felt that the Duroxon J-324 combined with a smaller quantity of polyethylene forms an excellent foundation for a glossy, tough, highly buffable self-polishing base. The microcrystalline wax is used as a "bodying agent" and to somewhat decrease the transparency of the emulsion. Its use is optional.

Loba C resin, as the leveling-additive, has been found to be compatible with the emulsifiable Fischer-Tropsch and polyethylene polymers. It contributes good gloss, outstanding water resistance and quickly hardens with the self-polishing base on drying. It is better in the latter respect in the formulation presented, than alkali soluble synthetic resins which tend to plasticize the wax film, at first, and slightly retard the hardening of the self-polishing base.

The American philosopher and psychologist, William James, dis-

(*Turn to page 68*)

**Polymer Floor Finish — Non-Scuff Type**

| | |
|---|---|
| A – Duroxon H-111 Nonionic Emulsion | |
| Duroxon H-111 | 100 lbs. |
| Emulphogene AM-870 | 30 lbs. |
| Water | 720 lbs. |
| | 850 lbs. |
| B – Alkali Soluble Polyvinyl Acetate Solution | |
| Vinac ASB-10 | 127 lbs. |
| Ammonia (28%) | 7½ lbs. |
| Water | 715½ lbs. |
| | 850 lbs. |

Final Composition
A – 30 parts by volume
B – 70 parts by volume

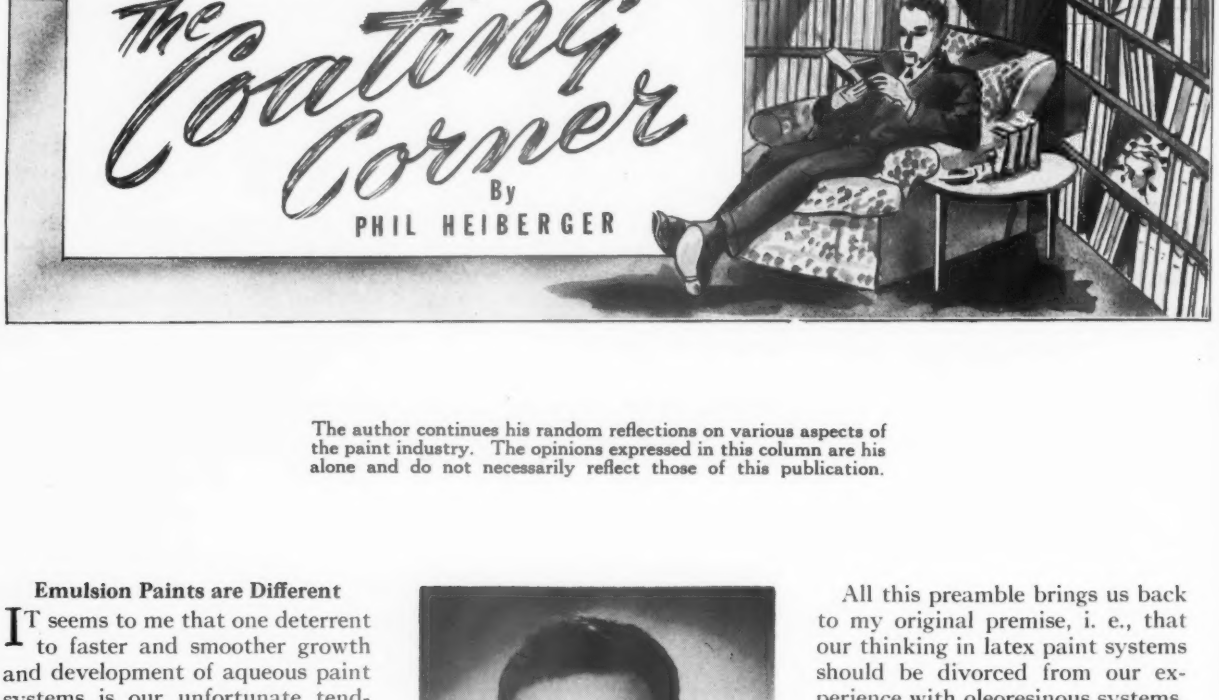
Let us compare the two types of products below.

**Table VII**

**Comparison of Properties**

| | *Average Shellac Type* | *Polymer Type (Table VII)* |
|---|---|---|
| Stability | Excellent | Excellent |
| Leveling | Excellent | Good |
| Gloss | Excellent | Very good |
| Water spotting | Poor | Excellent |
| Color (film) | Yellows with age | Excellent |
| Scuffing | Excellent | Excellent |
| Removability | Poor upon aging | Excellent |

**Table VIII**




The author continues his random reflections on various aspects of the paint industry. The opinions expressed in this column are his alone and do not necessarily reflect those of this publication.

**Emulsion Paints are Different**

IT seems to me that one deterrent to faster and smoother growth and development of aqueous paint systems is our unfortunate tendency to think of the latter as "kissin' cousins" of oleoresinous systems. Actually, the two represent entirely different species. As such, they are morphologically different and are subject to different norms of behavior.

If so, it is illogical to use similar raw materials, manufacturing techniques, and control methods; or to assume similar drying and aging mechanisms.

A latex system is essentially a pigment dispersion co-suspended in a preformed high molecular weight polymer dispersion. Drying takes place essentially by coalescence of these polymer particles. Once formed, the film undergoes little, if any, chemical change.

An oleoresinous paint, on the other hand, is a pigment dispersion suspended in a low molecular weight resin solution. Drying takes place by means of a series of still obscure chemical changes involving oxidation, condensation, degradation, and polymerization.

The chemical composition of the latex film is determined by its manufacturing variables prior to incorporation into paint. From a paint man's point of view, the film former is fixed. Once the particles are fused into a film, the film is essentially independent of environmental conditions. Optimistically speaking, paint properties can ultimately become formulating variables.

Phil Heiberger

Oleoresinous paints dry by chemical conversion and therefore the ultimate performance is strongly dependent upon early drying conditions. Differences in environment such as temperature, humidity, sunlight, industrial fumes, and substrate can markedly alter the course and mechanism of film formation. For this reason it is difficult to correlate any laboratory test with actual field performance.

All this preamble brings us back to my original premise, i. e., that our thinking in latex paint systems should be divorced from our experience with oleoresinous systems.

Evidence to substantiate this claim is being gathered slowly and it now appears that it may be possible to predict exterior performance of latex paints by laboratory tests alone. Consider the following abstract of an article *by H. E. Scheiber* entitled *"Exterior Coatings in the Winter Months"* [*Farbe u. Lack 61, 499-501, 565-8 (1955)*]:

Application of oil or oleoresinous paints during the winter months makes for inferior coatings, since at temperatures near the freezing point, the drying time is much longer and the film thus remains longer in its sensitive "youth" state. Coating compounds which do not, or do not exclusively, dry through oxidation, but through physical film formation, are superior in this respect. Emulsion coatings, in general, show astonishingly good winter properties. Organosols and hot-melt preparations, due to their rapid solidification have also promising properties for winter application.

An article by *J. H. W. Turner and S. Hodgson of British Resin Products Ltd.* entitled *"Composition-Property Relationships in High Polymer Emulsions" in the February 1956 issue of the Journal of the Oil and Colour Chemists' Association, pages 114-128 (Originally read at the Llandudno Conference on 'Film Structure and Adhesion')* is also

worthy of consideration. In their introduction, the authors state:

"Variation in the composition of the emulsion will affect the chemical structure and may involve physical changes of no less importance. Copolymers may show enhanced durability because of improved chemical stability; on the other hand improved durability may result from a change in physical properties such as flexibility. Likewise, it can be shown that polymer emulsions of identical chemical composition, but differing in a purely physical characteristic such as particle size, may behave differently as a paint media.

Assessing the effect of changes in emulsion composition on the properties of the paint made from it can be laborious and misleading unless a wide range of the paint compositions is studied for each emulsion variable. Physical tests on the emulsion can be used for preliminary sorting and, if interpreted correctly are useful guides to paint performance. Such physical tests include tensile strength, extensibility, water-vapour permeability and embrittlement on aging, carried out on cast films. It is probable that this laboratory sorting technique can be used to predict the performance in paint of emulsions more successfully than of oleoresinous media. Nevertheless, at this stage the possibilities revealed by laboratory assessment do require confirmation by field trials before being accepted without reservation."

I strongly recommend both of these articles for serious consideration.

### "Paintatomics"

ACCORDING to *Dr. Willard F. Libby*, a member of the *U. S. Atomic Energy Commission*, in an address before the American Chemical Society Division of Physical and Inorganic Chemistry in Dallas, nuclear radiation is saving industry and agriculture several hundred million dollars a year. Even if the peaceful use of atomic energy is never fully realized, discoveries already made promise to more than pay for the nation's entire 14 billion dollar atomic program to date.

Credit for this report goes to two research developments, nuclear radiation and radioisotopes. Industrial applications of radiochemistry alone is saving American industry today over 100 million dollars a year because it permits manufacture of better products with less waste.

Libby explained that gamma radiation—exposing items to radiation from cobalt-60 or spent fuel elements—causes molecules to cross link. By exposing polyethylene to gamma radiation, it can stand greater heat without distortion, for example at sterilization temperatures.

As a practical use of this discovery, Libby explained that the United States Army is now spending about $40 per man per year to pasteurize and refrigerate food. By placing food in plastic containers and submitting both to irradiation, preservation may take place and vast savings could be effected. If we could save only half of what is spent today, the government could save $40,000,000 a year.

We in the coatings industries should not lose sight of the fact that every advance in food preservation and packaging is a blow at some segment of the coatings field. This is not the time nor place for moralizing, but if we want to keep abreast of these advances and still hold on to the use of protective coatings in packaging, it is still not to late to get started in irradiation of coatings.

In view of this, the following report may be just what the doctor ordered for paint scientists: *"Vulcanization of Rubber with High Intensity Gamma Radiation" by W. W. Jackson and D. Hale (PB 111675, 37 pages, $1.00 obtainable through the Office of Technical Services, U. S. Dept. of Commerce, Washington, D.C.)*

Vulcanization is primarily a cross-linking process, which takes place at points on the rubber molecule which are reactive to such vulcanizing agents or accelerators as sulfur, sulfur derivatives, metallic oxides, amines and others under reaction conditions involving heat, time, amount and type of agent.

At present, relatively few of the reaction mechanisms which are involved in the vulcanization of rubber are precisely understood. Just like in the drying or curing of paint films, most variations from a given procedure markedly influence the final product.

This report reveals that high intensity gamma radiation of rubber has produced elastomers with markedly better resistance to dry heat and oil aging than chemically vulcanized compounds.

Many experimental polymers which resist chemical vulcanization can be readily vulcanized by irradiation. Cross linking occurs without chemical vulcanizers and high curing temperatures. No residual radioactivity is imparted to the polymers. Unique physical and functional properties of these elastomers are described in the report.

A word to the wise should be sufficient.

### Healthy Paints

There are two sides to the question of protecting paints against microbiological deterioration—shelf life and film life—but there is not one wholly satisfactory answer to this question. Present practices are in a state of flux and changes may be pending. Perhaps it's time for microbiologists and paint technologists to exchange ideas on the subject.

As far as I know, no responsible authority has publicly suggested the use of antibiotics for preventing paint spoilage. But if antibiotics can preserve food, they should be able to preserve paint. It has been found for example, that spoilage of meat, milk, leafy vegetables, poultry, and fish can be averted by the use of several parts per million of antibiotics normally used to control disease.

If meat, fish, and milk can be preserved, then why not paint, which is inherently more stable? Speaking at the *International Association of Milk and Food Sanitarians*, Dr. C. L. Wrenshall of Chas. Pfizer & Co., Inc. said that antibiotics could be used with or without refrigeration, with the added advantage that they will not cover up damaged, contaminated, or inferior foods.

"In addition," he said, "antibiotic residues may present little or no problem, since antibiotics, relatively unstable compounds, lose activity during storage and are easily destroyed by heat, as in cooking."

Of course this latter factor may mitigate against use of penicillin, terramycin, or streptomycin in paints; but, on the other hand, if we are only interested in package stability, it might be a decided advantage. It remains to be determined whether or not the antibiotic is unreactive and whether it also causes undesirable side reactions such as caused by the preservatives now in use.

# NEWS

## Committee D-1 Holds First Symposium at ASTM Meet

Committee D-1 on Paint, Varnish, Lacquer and Related Products, second oldest committee of the American Society for Testing Materials, held its first symposium at the recent 59 annual ASTM meeting in Atlantic City, N. J.

Three speakers sat on the panel. Their subject was "Use of Test Methods in Checking Floor Coverings." The speakers were C. C. Hartman, National Bureau of Standards; A. F. Bohnert, technical director, Enterprise Paint Mfg. Co., and R. J. Phair, Bell Telephone Laboratories.

Mr. Hartman discussed "Shellac," tracing its history, sources and chemical nature. He described the manufacture, storage and packaging of shellac, and explained a number of the properties and applications of shellac varnishes.

Mr. Bohnert spoke on, "Proper Uses of Floor Sealers and Varnishes," covering these five types: oleoresinous, lacquers, emulsion and water solutions, and non-drying. The characteristics, physical properties, and uses of each of the types, as well as the preparation of the surfaces, and applicators were discussed.

Mr. Phair discussed the work of Sub-Committee IX on Varnishes. Using lantern slides, he described the test results of six floor coating materials applied on a corridor floor that has heavy foot traffic. The slides showed wearing characteristics after five and nineteen months' exposures. Another set of slides showed laboratory evaluation of the same six materials which had been sprayed with three coats on wood panels.

### Shell Chemical Addition

Shell Chemical Corp. recently broke ground for a two-story addition to its technical service laboratory in Union, N. J. The new building will contain approximately 25,000 square feet of laboratory and office space.

Paul Mayfield

G. F. Hogg

## Paul Mayfield Elected Hercules Vice President

Paul Mayfield, a member of the board of directors of Hercules Powder Co., has been elected a vice president and member of the company's executive committee. Additional changes in assignments for executive personnel are:

J. B. Johnson, vice president, has resigned from the executive committee, but will continue as a vice president and a member of the board of directors.

G. Fred Hogg has been named general manager of the naval stores department to succeed Mr. Mayfield.

John H. Long has been named general manager of the paper makers chemical department to succeed R. Rockwell, who retired June 30.

Mr. Mayfield, newly elected vice president, has been general manager of the naval stores department since 1951 and a member of the board of directors since 1952. A prominent figure in the agricultural chemicals industry, he is a past president and a member of the board of the National Agricultural Chemicals Association.

Mr. Mayfield joined Hercules as a chemist in 1925, upon graduation from Indiana University. Two years later, he was transferred to the sales staff, and in 1934 was named manager of naval stores sales in Chicago.

He returned to Wilmington in 1936 as assistant director of sales of the naval stores department, and three years later was made director of sales. He was named assistant general manager of the department in 1943, and general manager in 1951.

### Continental Can Acquires

Continental Can Co. has announced the acquisition of Canadian Crown Cork Co. Ltd. The announcement was made jointly in Montreal by Frank A. Whittall, president of Continental Can Co. of Canada Ltd. and John M. Gardiner, president and general manager of Canadian Crown.

The move marks the first entry of a metal container company in Canada into the crown cork field.

**SOMETHING NEW FOR NEW MEXICO: Photo above show the water treating towers of the new semi-reinforcing furnace carbon black plant opened recently in Eunice, New Mexico, by Continental Carbon Co., an affiliate of Witco Chemical Co. of New York. This furnace-type plant, first of its kind to be built in New Mexico, will produce carbon black through the controlled combustion of natural gas. Its four gas-fired furnaces have an annual capacity of 25 million pounds.**

# NEWS

## Four Symposia Scheduled For ACS Paint Div. Meet

Four symposia have been scheduled for the Division of Paint, Plastics and Printing Ink Chemistry of the American Chemical Society at its 128th National Meeting Sept. 16-21 in Atlantic City, N. J.

Following is the title of each symposium and its respective chairman:

*Wire Enamels*, R. W. Auxier, Westinghouse Electric Corp., Research Laboratories, East Pittsburgh, Pa.

*Epoxy Resins*, S. O. Greenlee, S. C. Johnson & Son, Inc., Racine, Wis.

*Isocyanate Polymers*, E. E. Hardy, Director of Research, Mobay Chemicals Co., New Martinsville, W. Va.

*Mechanism of Film Degradation*, E. B. FitzGerald, Fabrics & Finishes Dept., E. I. duPont de Nemours & Co., Experimental Station, Wilmington 98, Del.

•

### Daniel Products Appoints

Daniel Products Co. has announced the appointment of Bate Chemical Corp., Ltd., Toronto, as sales representatives for the "Tint-Ayd" and "Flat-Ayd" line in Canada. Carmona & Hauxhurst Inc., of San Francisco has been appointed sales representatives for the same lines in northern California.

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### Zinc Pigments Committee

Formation of a special committee of the American Zinc Institute to promote the use of zinc pigments in exterior house paints has been announced by John L. Kimberley, executive vice president.

The zinc pigments committee represents manufacturers of zinc oxide, consists of a technical subcommittee responsible for research and the preparation of technical literature, and a steering subcommittee to direct and pass on the work of the technical subcommittee, according to Mr. Kimberley.

## Vinyl Dispersions Div. Set Up by Plastics Society

A vinyl dispersions division to operate within the framework of the Society of the Plastics Industry has been set up by the Society.

Purpose of the new division will be to bring about stable, well-intergrated growth in the vinyl dispersions industry; develop specifications, physical test procedures and performance standards on vinyl dispersions for eventual adoption by the industry; evolve standards covering vinyl dispersions used for both industrial and consumer application.

Also the new division will collect and disseminate statistics and other important scientific and engineering information on vinyl dispersions, as well as give careful consideration and expression of opinion on questions affecting the industry.

The executive committee for the new division is as follows: Chairman—James Hull, Reynolds Chemical Co., Ann Arbor, Mich.; Vice Chairman—Audley Clarke, Chemical Products Corp., E. Providence, R.I.; Treasurer—J. M. Perone, Wooster Finishes, Wooster, Ohio; Delegates at Large—Arthur B. Sherry, Stanley Chemical Co., E. Berlin, Conn., and Walter J. Kaufman, Watson-Standard Co., Pittsburgh, Pa.

Among the companies actively supporting the new division are: John L. Armitage Co., Newark, N. J.; Chemical Products Corp., E. Providence, R. I.; Dennis Chemical Co., St. Louis, Mo.; Elastomer Chemical Corp., Newark, N. J.; Federal Chemical Corp., Brooklyn, N.Y.; Flexible Products Co., Marietta, Ga.; Jamestown Finishing Products, Jamestown, N. Y.; Metal & Thermit Corp., chemical division, New York; Michigan Chrome & Chemical Co., Detroit, Mich.; Munray Products, Inc., Cleveland, Ohio; New England Tape Co., Hudson, Mass.; Protective Treatments, Inc., Dayton, Ohio; Reynolds Chemical Products Co., Ann Arbor, Mich.; Stanley Chemical Co., E. Berlin, Conn.; Watson-Standard Co., Pittsburgh, Pa.; Wooster Finishes Corp., Wooster, Ohio.

### Canadian Distributor

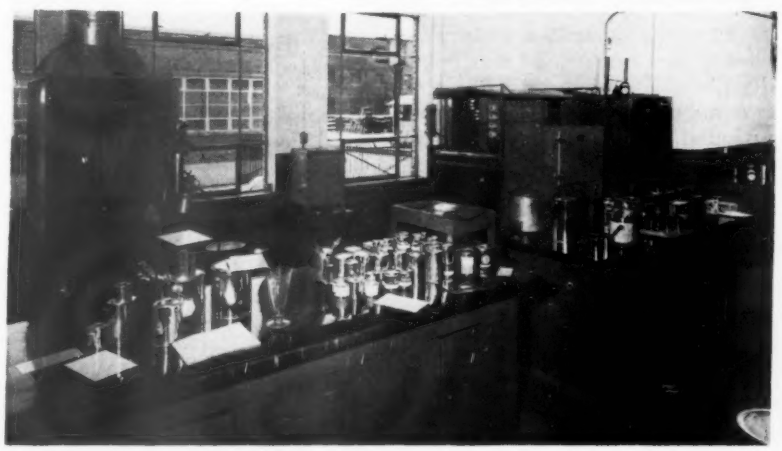
Canada Colors and Chemicals, Ltd., Toronto, Canada, has been appointed distributor for A-C Polyethylene in the areas of Ontario, Quebec, and the Maritime Provinces by Allied Chemical International Corp.

The company will market Semet-Solvay's low molecular weight A-C Polyethylene to the polish, paper, dairy, plastic, rubber, ink, and bakery industries.

### Aromatic Made Agent

Newport Industries, Inc., New York City has announced that Aromatic Products, Inc. of New York is now its exclusive selling agents for Menthol dl (Racemic) and Thymol N.F.

Both products will be sold throughout the country by salesmen of Aromatic Products working out of New York, Chicago, Dallas, Memphis, Pittsburgh, Los Angeles, Boston and Fort Lauderdale.



**CANADIAN FACILITY: A portion of The Glidden Company's new laboratory facilities in Toronto, Ontario is shown in the photo above.**

# NEWS

## Develop New Paint With High Temp. Resistance

A new and unique high temperature resistant paint has been developed at the Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Va. Designed primarily for field application for the protection of diesel engine exhaust systems, it has proved to be even more satisfactory for plant application.

Senior Project Engineer Emil J. York states that the paint can be applied by either brush or spray and will air dry to handle within one hour. In its air-dried state, it provides excellent protection from rust and corrosion and, he said, after complete curing the protection afforded is unlimited.

The paint can be applied and cured in place by merely using the engine or it can be applied and cured immediately as in plant operation.

In tests conducted by a large manufacturer of heavy construction equipment the paint is said to have remained in excellent condition after more than 18 months' exposure at his proving grounds. Tests at the Engineer Laboratories reportedly show the paint to be in perfect condition after 1200 hours exposure to temperatures in excess of 1400° F.

Major requirements for satisfactory performance are a clean and oil or grease-free surface, preferably blasted, and a controlled maximum dry film thickness of 2.5 mils.

A military specification is being prepared on this material and its use will be mandatory on Corps of Engineers equipment.

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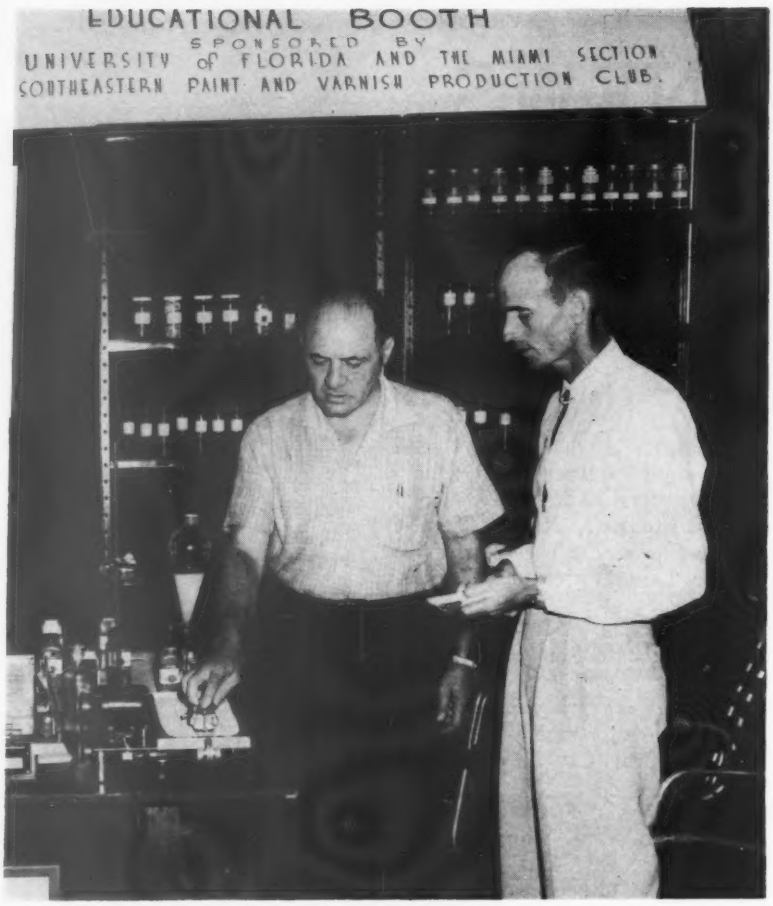
### Grants Given by Hercules

Twenty-one U. S. colleges and universities have been given unrestricted grants-in-aid totaling $70,000, it was announced recently by Hercules Powder Co., manufacturer of chemical materials for industry. This brings the company's annual contribution for education to more than $150,000.


EDUCATIONAL BOOTH
SPONSORED BY
UNIVERSITY of FLORIDA AND THE MIAMI SECTION
SOUTHEASTERN PAINT AND VARNISH PRODUCTION CLUB.

**EDUCATIONAL BOOTH: The Miami Section of the Southern Club of the Federation of Paint and Varnish Production Clubs together with the University of Florida sponsored an educational booth at the recent Convention of the Florida Council of the Painting and Decorating Contractors of America. Many of the raw materials that go into the makeup of paint, and various testing instruments used in the laboratory were shown. Photo above shows Max Socloff of Flamingo Research Labs. showing an interested onlooker the workings of the washability machine. The sign above should read "Southern Paint," etc., not "Southeastern" as the sign painter erroniously printed.**

## Industrial Opportunities High In Pacific Areas

"Both the opportunity and desire for more industrialization is stronger than ever in the Pacific areas." This is the report of Norman Klein, director of export for Morehouse Industries, Los Angeles, on his recent return from a two month visit to key Pacific points in the interests of Morehouse Industries, and The Cowles Dissolver Co. of Cayuga, New York.

His trip included 15 meetings with government and industry representatives in New Zealand, Australia, The Phillippines, Formosa and Japan. In general, said Mr. Klein, the processing industries are prospering and are interested as never before in superior U.S. manufacturing equipment. He pointed out that Pacific area manufacturing firms are doing increasingly well on their own initiative, and with their own funds, and are enjoying the protection of their local governments.

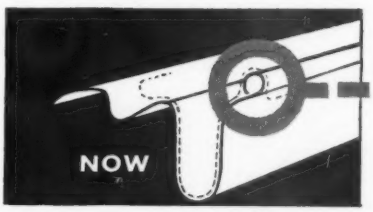
In the field of capital goods, he added, there is increasing competitive pressure from European and Japanese manufacturers. "U.S. manufacturers can best compete," said Mr. Klein, "by offering the very benefits which have built industry in America: superior quality, quick delivery, added technical assistance, and especially, thorough follow-up service after sales. This matter of follow-up, particularly is being neglected by other countries."

# New Continental can for polyvinyl acetate and latex base paints

*Gives 6 to 9 months longer shelf life*

RAW EDGE ON INSIDE OF CAN MAY TOUCH PAINT PRODUCTS

Made with an inward curl, former multiple friction ring cans left an edge of raw metal inside the can. If corrosion started here, it might undercut interior enamel and result in rust.




RAW EDGE ON OUTSIDE OF CAN **CANNOT** TOUCH PAINT PRODUCTS

The Outward Curl in the Tripletite ring still has an edge of raw metal. But this raw edge is now outside the can. There is no chance of exposed steel touching your paints.

Now, extensive tests prove that you can give your polyvinyl acetate and latex base paints 6 to 9 months *extra* shelf life—with Continental's new Outward Curl paint can.

Because the Tripletite friction ring is curled outside the can, this special container has *complete inside enameling*. Your paints never come in contact with raw metal. Add to this the protection of Continental's Tripletite lid, and what a sales story you've got to tell your customer!

Continental Outward Curl paint cans are available immediately. Why not be among the first to use them? Along with the finest in containers, we'll give you the finest in tailor-made service.

**CONTINENTAL CAN COMPANY**

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

# NEWS

## G.E. to Sponsor Color Measurements Course

A scientific color measurements course will be sponsored by General Electric's Instrument Department, Sept. 24-28 at Portsmouth, N. H.

Featuring a full curriculum of spectrophotometry and colorimetry industrial applications, the course will be taught by representatives of such companies as American Cyanamid, Pacific Mills, Inter-Chemical Corp., E. I. DuPont, as well as the National Bureau of Standards, private consulting laboratories, and educational institutions. Tuition will be $110.00.

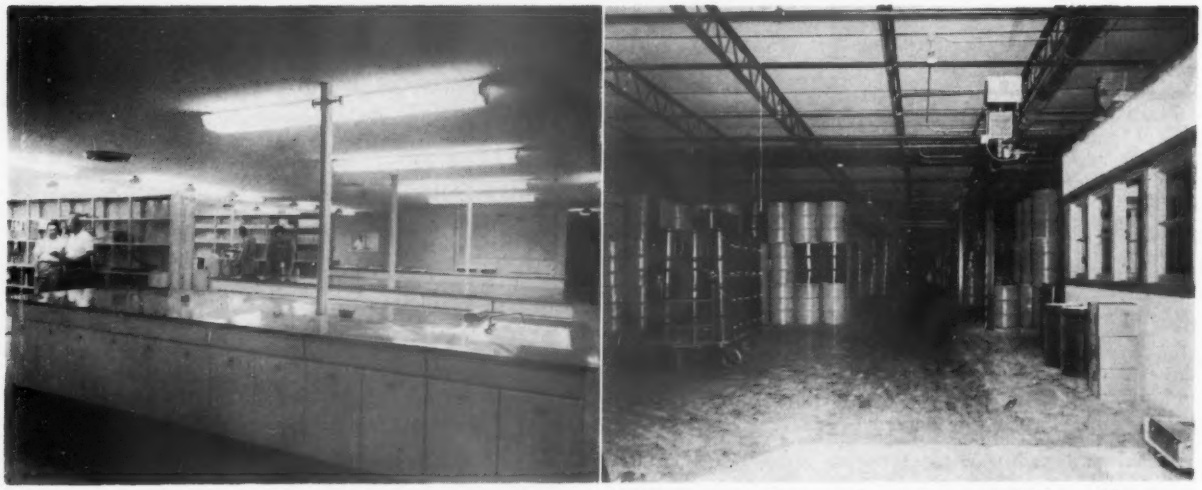
Instruction will feature the seminar approach as technical specialists lecture, followed by laboratory sessions utilizing the most modern equipment.

Instrument Department engineers say a basic familiarity with such recognized textbooks as, "The Handbook of Colorimetry," by A. C. Hardy, and "Color in Business, Science, and Industry," by Deanne B. Judd, will be helpful to prospective students.

Complete information on the course and hotel accommodations may be obtained by writing to Frank Kelley, Instrument Department, General Electric Co., 40 Federal St., Lynn, Mass.

## *STUDENTS ATTEND NINTH PAINT SHORT COURSE*

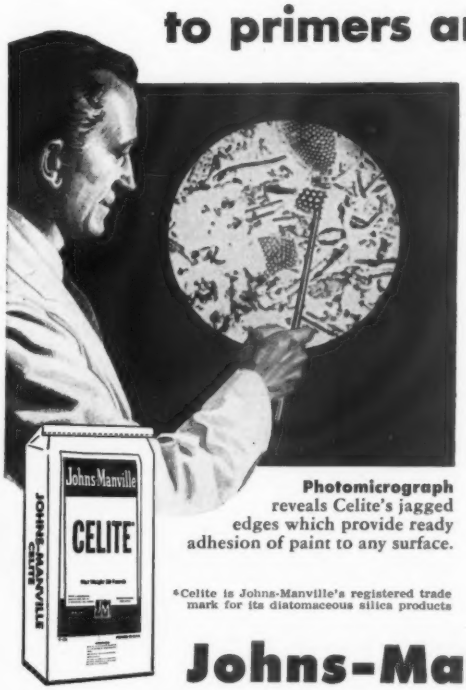
**BEGINNERS OF ALL AGES: The contented group shown above, students who last month completed the Ninth Paint Short Course for Beginners, prove that summer is a good time to study and have fun, too. The course is given by Dr. Wouter Bosch, Professor and Chairman, Department of Paints, Varnishes and Lacquers, North Dakota Agricultural College. From left to right, first row: Dr. Bosch; Robert J. Coker, Scarfe and Co. Ltd., Brantford, Ont.; Mrs. Coker; Robert G. Lerch, Pioneer Paint and Varnish Co., Tuscon, Ariz.; Mrs. Lerch; Mrs. W. D. Gallentine; W. D. Gallentine, George E. Moser and Son, Inc., Pontiac, Mich.; Jack J. Hill, Cook Paint and Varnish Co., Topeka, Kan.; Buzz Hill; Mrs. Hill, and Mrs. Bosch. Second row: Ray E. Revier, Stewart Paint Mfg. Co., Minneapolis, Minn.; Roderick E. Canfield, The R. J. Brown Co., St. Louis, Mo.; Lester A. Weinert, Buckman Laboratories, Inc., Memphis, Tenn.; Fred A. Rothwell, Buckman Laboratories, Inc.; W. A. George, P. D. George Paint & Varnish Co., Clayton, Mo.; Elwood E. Pease, S. C. Johnson and Son, Inc., Racine, Wis.; Lloyd E. Franklin, Kentucky Color and Chemical Co., Louisville, Ky., and Arthur Vogel, Vogel Paint and Wax Co., Orange City, Iowa. Third row: John E. Thulin, Stewart Paint Co., Baraboo, Wis.; Dwight E. Smith, The Cary Co., River Forest, Ill.; John S. Little, Standard Ultramarine and Color Co., Huntington, W. Va.; Al Maddox, Seidlitz Paint Co., Kansas City, Mo.; Melvin L. Ingels, Ingels Paint Mfg., Birmingham, Ala.; Matthew T. Purpura, Harshaw Chemical Co., East Cleveland, Ohio.; M. Harris Nelson, Kentucky Color and Chemical Co., and Charles W. Fletcher, Hilton-Davis Chemical Co., Div., Cincinnati, Ohio. Fourth row: W. A. Cary, The Cary Co., La Grange Park, Ill.; J. B. George, Distillers Sales Corp., Clayton, Mo.; William H. Rhein, The R. J. Brown Co.; T. F. George, P. D. George and Varnish Co.; Richard T. Ross, Buckman Laboratories, Inc., and John J. O'Dwyer, International Paints (Western) Ltd., Vancouver, B.C. Fifth row: Roger A. Walters, The Harrison Paint and Varnish Co., Canton, Ohio; Robert William Nixon, Harrison's and Crossfield (Canada) Ltd., Winnipeg, Manitoba; Albert M. Lechner, Carl A. Lechner Co., Chicago, Ill.; Lewis J. Dorsey, Montgomery Ward, Wilmette, Ill., and William J. Ulmer, Hilton-Davis Chemical Co., Division, Blue Ash, Ohio.**



**LARGER QUARTERS: Fred'k A. Stresen-Reuter, Inc., supplier of paint materials, is now located at 325 W. Main St., Bensenville, Ill. The new and larger quarters contain laboratories, offices, and warehouse facilities. Photo at left is a view of a portion of the recently completed general laboratory, at right, view of 15,000 square ft. warehouse.**

*What helps military and maintenance finishes adhere better . . . last longer?*

# CELITE diatomite pigments add "tooth" and toughness to primers and topcoats




**Photomicrograph** reveals Celite's jagged edges which provide ready adhesion of paint to any surface.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

NO ONE examines the performance of paint ingredients more critically than government experts. And time after time, they specify Celite*. These microscopic particles of silica are hard and tough. Suspended in the paint film they provide extra durability for the severe conditions which military and maintenance coatings must withstand. Their irregular shapes projecting through the film anchor primers to any surface . . . give an excellent "tooth" for adhesion of topcoats.

Celite provides control of gloss to any degree including the dead flat finish required for military camouflage coatings. When used as a filler, Celite's high bulking properties hide surface imperfections and ease sanding. The loosely interwoven structure of the tiny particles creates a flexible film highly resistant to cracking.

Special grades of Celite have been developed for many different military and maintenance applications. Write for complete information to Johns-Manville, Box 60, New York 16, N. Y. In Canada, address 565 Lakeshore Road East, Port Credit, Ontario.

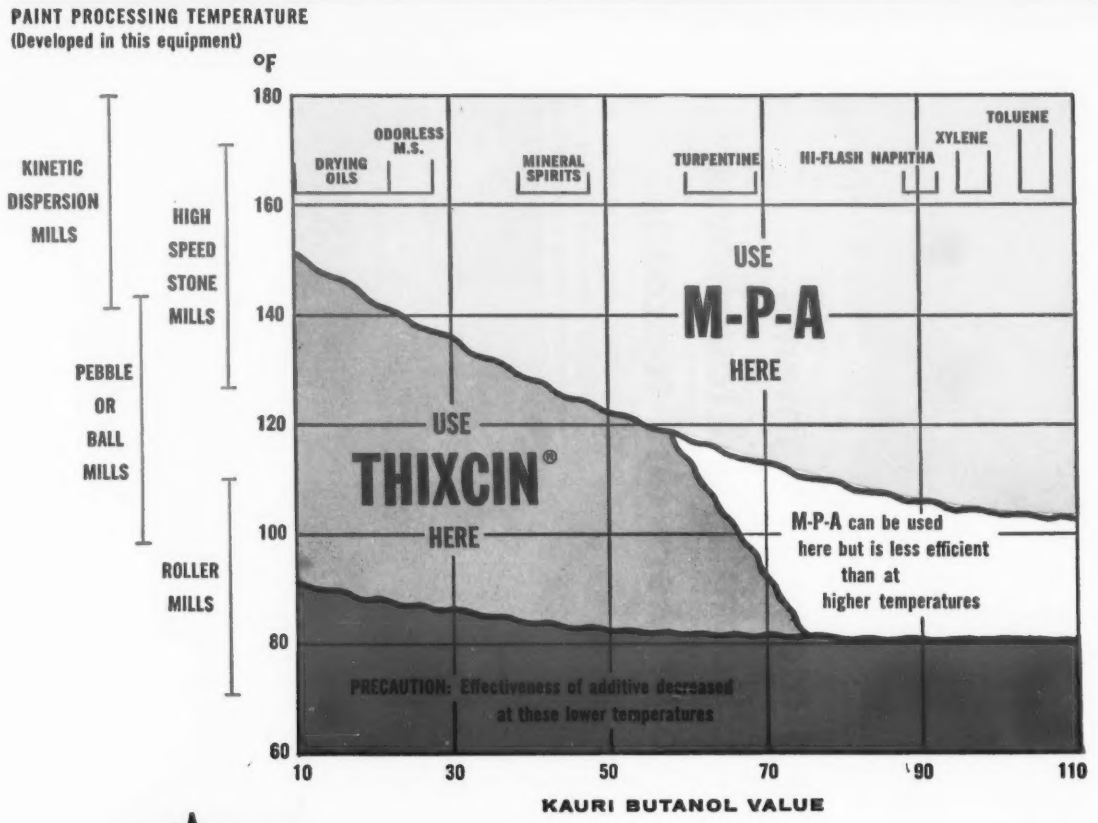
JOHNS-MANVILLE JM PRODUCTS

**Johns-Manville CELITE** THE EXTENDER PIGMENTS FOR ALL COATINGS

TO MEET A WIDER RANGE OF FORMULATION AND PROCESSING REQUIREMENTS

# NOW 2 MULTI-PURPOSE PAINT ADDITIVES that impart

1 improved brushability
2 stable pigment suspension
3 sag resistance
4 controlled penetration
5 thixotropic body




**M-P-A** *for high temperature processing*

*and*

**THIXCIN®** *for medium temperature processing*

Whatever milling temperature or solvent you work with, better "paint-ability"... an easier-to-use product at the consumer level... better "sale-ability" and greater customer satisfaction result when you formulate with M-P-A or THIXCIN.

Choose the one that best suits your requirements. Working samples and technical literature will be mailed on request.

THE Baker CASTOR OIL COMPANY • 120 BROADWAY • NEW YORK 5, N. Y.

ESTABLISHED 1857

## New Alkyds: WASHABILITY—WITHOUT LOSS OF GLOSS

New oil-modified alkyds—made with epoxy phenolic ethers and *Glycerine*—offer unusual resistance to solutions of soaps, alkalies and synthetic detergents. What's more, these new resins are said not to lose their gloss after exposure to the atmosphere.

The new alkyds, described in a recent patent*, are made by heat treating components of conventional oil alkyds with a glycidyl mono-hydric phenolic ether or other ethers containing an alkyl epoxide group. A typical formulation contains Glycerine, soybean oil, glycidyl ether of p-octyl phenol, and phthalic anhydride.

Surface coatings made with the new alkyds retain all the properties for which Glycerine-based alkyds are so well known—flexibility, toughness, adhesion and durability—plus added chemical resistance and gloss retention. In tests, the new resins were unaffected by a wide range of chemical agents which damaged other alkyd coatings.

**Here again,** *nothing takes the place of Glycerine.*

*U. S. 2,731,429

This balanced group of properties keeps Glycerine's usefulness growing

HYGROSCOPICITY • STABILITY • SOLVENT POWER • VISCOSITY • NONVOLATILITY • NONTOXICITY • TASTE • HYDROXYL/MW RATIO • HUMECTANT • CARRIER • SOLVENT • LUBRICANT • SOFTENER • EMOLLIENT • ANTI-FREEZE • ALKYD BASE •

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☐ 20-page booklet "Glycerine Alkyds Tailored to Need"

☐ 8-page booklet on "Federal Specifications for Glycerine"

☐ 20-page booklet on Glycerine properties and applications

*For your free copy of any or all of these booklets write:* **GLYCERINE PRODUCERS' ASSOCIATION** • 295 Madison Ave., New York 17, N. Y.

**Low Cost, High Hiding, Brilliant Red Pigment with Excellent Light Stability and Exterior Durability**

# Fire Red Toner

**FIRE RED TONER,** when used in blends with darker reds, i.e., lithol rubines, will give lower cost reds with hues similar to the higher priced Toluidine Reds, with little sacrifice of durability.

*Recommended for*

ARCHITECTURAL PAINTS
INDUSTRIAL FINISHES
IMPLEMENT & TOY ENAMELS

HARSHAW

manufactured by ZINSSER & CO. Inc., Hastings-on-Hudson 6, New York, subsidiary of

THE HARSHAW CHEMICAL CO.

ZINSSER

CLEVELAND 6, OHIO

# NEWS

## Dow says: Have a Coke! In Latex Paint Promotion

A fall paint promotion involving latex paint, Coca-Cola and a dress pattern is reaching the attention of paint manufacturers now. The Dow Chemical Co., manufacturers of latex, is sponsoring the promotion.

Hundreds of executives in the paint industry are now receiving miniature cases of gold Coke bottles topped by a card reading "Come in and talk about latex painting. . .over a Coke."

The paint and Coke combination follows through to the paint dealer who will offer Cokes in his store with the slogan above. Serving the Cokes is expected to encourage a more lesiurely discussion of paints and will build up store traffic at the same time.

In September, October and November leading magazines will feature ads showing a young lady atop a ladder pausing in her painting to drink a Coke. Eye catcher for women readers is the efficient, comfortable work outfit she is wearing.

The feature costume will be Capri pants, which have already proved excellent for women's work, and a cobbler's apron equipped with capacious pockets for painting equipment.

•

### To Enlarge Pigment Plant

Final approval has been given by Pennsylvania Color & Chemical Co. to plans for enlarging its plant at Doylestown, Pa. New facilities will make possible an increase of about 20 per cent in output.

Some of this, according to V. C. Bidlack, president, will be in the form of increased manufacturing capacity for pigment dispersions in vinyl resins and also for a broad line of transparents for foil and metal coatings—products which have been subject to recent research emphasis by the company. The new unit is planned to come on stream during the first quarter of 1957.

**MEN MAKE THE DIFFERENCE: This was the title of a speech by Verne E. Martin, retired general sales manager of The Maytag Co., at the recent annual Executive Conference of Spectro-matic Associates—international organization of zone paint manufacturers producing under the Spectro-matic Paint Color System. Shown above, left to right: Ralph J. Baudhuin, president of Rockford Paint Mfg. Co.; Mr. Martin; John R. Baudhuin, vice president of Rockford Paint and executive director of Spectro-matic Associates, and J. A. Brodie, Marshall-Wells Canadian Companies, Ltd.**


*for*

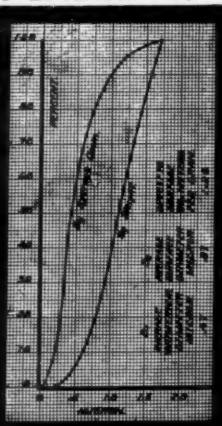
**EXTERIOR FINISHES**

*A low-oil absorption, easy wetting, lead-free Zinc Oxide.*

Magnification 1500X
Approx. Scale: 1 Micron = 1/16 in.

**ST. JOE GREEN LABEL #17**

| | |
|---|---|
| *Representative Chemical Tests* | |
| ZnO | 99.20% |
| Pb | .03 |
| Cd | .01 |
| Cl | .02 |
| Acidity as $SO_3$ | .15 |
| Total S as $SO_3$ | .35 |
| $H_2O$ Soluble Salts | .70 |
| Insoluble in HCl | .15 |
| Loss at 110°C. | .30 |
| *Representative Physical Tests* | |
| *Particle Size* | |
| Average numerical diameter $D_1$ — microns | .47 |
| Average surface diameter $D_2$ — microns | .87 |
| Specific surface — Sq.M./gram | 1.26 |
| Percent fines under .50 micron | 6.0 |
| *Specific Gravity* | 5.65 |
| *Apparent Density — lb./cu. ft.* | 40. |
| *Cleanliness* | |
| Percent thru 325 mesh screen | 99.92 |
| *Oil Absorption — Rub-out* | |
| Grams oil/100 grams ZnO | 12. |



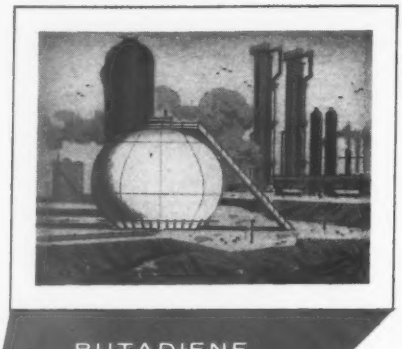
*Particle Size Distribution*

**ST. JOSEPH LEAD COMPANY**
250 PARK AVE.
NEW YORK CITY 17
Plant & Laboratory: Monaca (Josephtown) Pa.

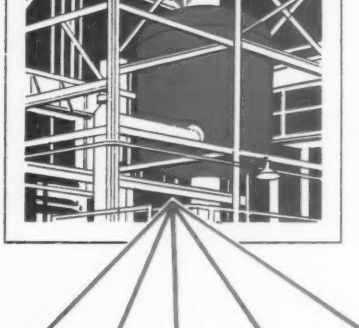
St. Joe Green Label #17 is a relatively large particle size, calcined Zinc Oxide which contains a minimum amount of extremely fine particles. House paints containing this pigment are characterized by excellent color, gloss and durability.

***Complete physical and chemical properties of our paint grade zinc oxides are described in our new technical manual, ST. JOE ZINC OXIDES. Write for your free copy — on your company letterhead please.***

STYRENE

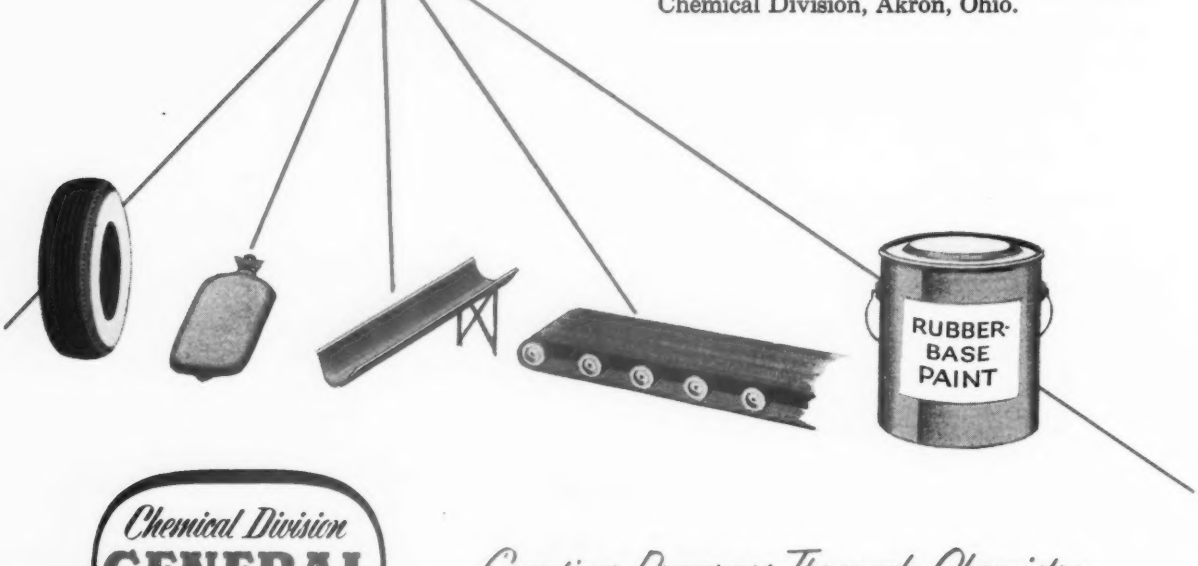


BUTADIENE



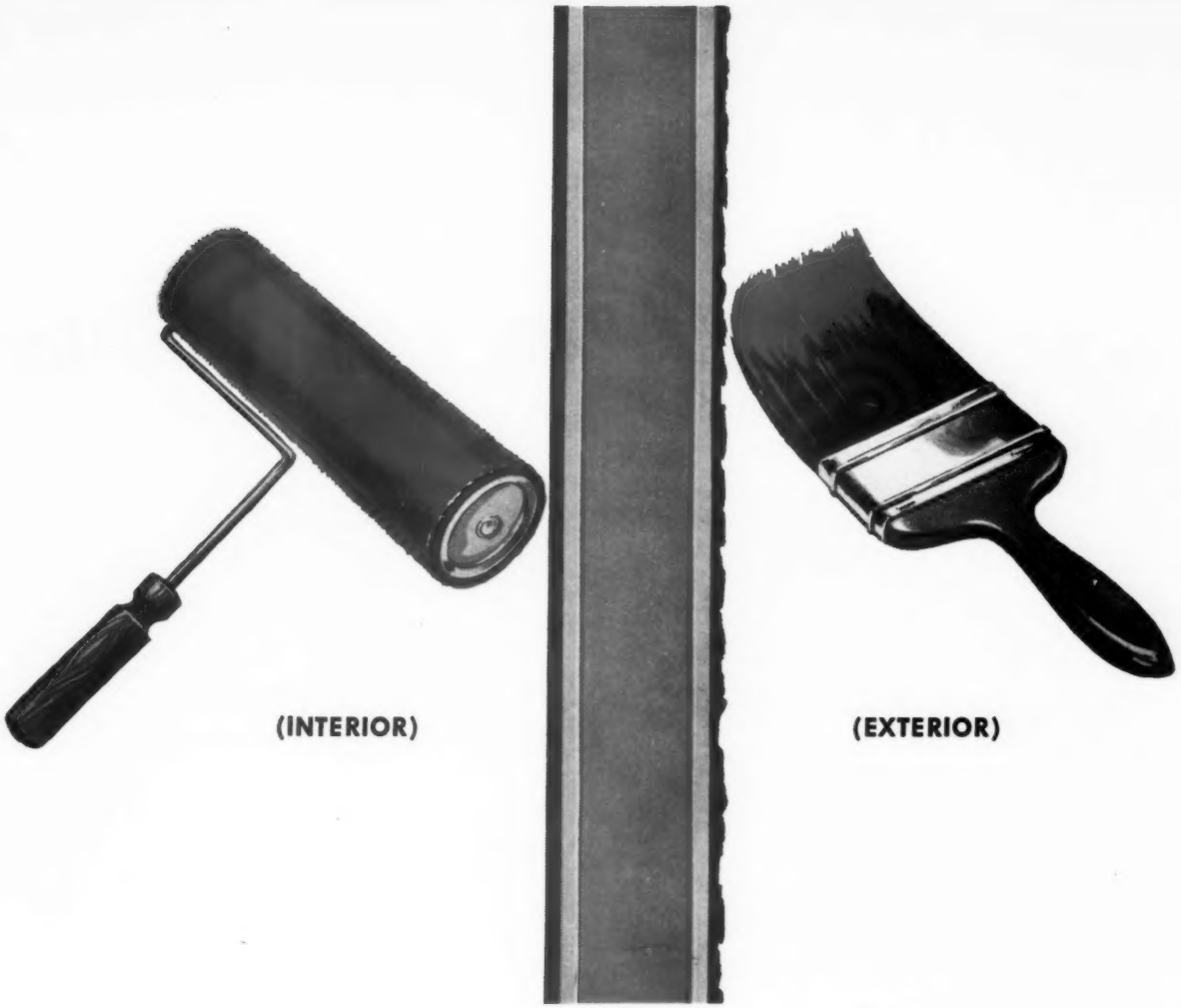
# Rubber has proved its superiority!

50,000,000 gallons of rubber-latex paint sold in 1955 proves the public's enthusiastic acceptance of its superiority. Cash in on the rapidly increasing demand for latex paint. Get a sample of GEN-FLO 67 and try it for yourself. GEN-FLO will build outstanding scrub resistance, cleansability and freeze recoverability into your product. THE GENERAL TIRE & RUBBER CO., Chemical Division, Akron, Ohio.




Chemical Division
GENERAL
THE GENERAL TIRE & RUBBER CO.
GEN-FLO

*Creating Progress Through Chemistry*




## One vehicle for both interior and exterior paints...

# Rhoplex AC-33 acrylic emulsion

Here's one way—*the* way—for you to improve the manufacture of interior and exterior emulsion paints: use RHOPLEX AC-33. With this double-feature vehicle, you can simplify inventory problems and produce interior and exterior paints interchangeably.

Paints based on RHOPLEX AC-33, whether designed for indoor or outdoor use, can be applied easily by brush, roller, or sprayer to a variety of surfaces—plaster, wallboard, masonry, stucco, cinder block, brick. And surfaces can be old or new, wet or dry.

RHOPLEX AC-33 gives paints excellent durability, color retentiveness, and resistance to water spotting and attack by alkalis. The fast-drying coating becomes odorless almost immediately, making indoor painting pleasant to painters and room occupants alike.

With RHOPLEX AC-33, one vehicle equals two, and the two add up to a host of sales and manufacturing advantages.

*Chemicals for Industry*

**ROHM & HAAS COMPANY**

**THE RESINOUS PRODUCTS DIVISION**

**Washington Square, Philadelphia 5, Pa.**

*Representatives in principal foreign countries*

*RHOPLEX is a trade-mark, Reg. U.S. Pat. Off. and in principal foreign countries.*

# Taken a good look at

# new, lower vinyl resin costs?

Now, you can have the superior performance, stronger sales story of Vinyl Resins at lowered cost.

Previous costs may have been too high for your formulations. Today, take a *new* look... a close look...and a *good* look for you. Because you'll be quite surprised when you recalculate to see how reasonably you can formulate and produce with BAKELITE Brand Vinyl Resins.

With BAKELITE Resins you get a broad line of resins for greater diversity...and some newcomers in resins and techniques that can give you a real opportunity for sales leadership.

Better write today for up-to-date information. Dept. OQ-153.

**BAKELITE Vinyl, Polyethylene, Phenolic, and Epoxy Resins and Styrene and Vinyl Acetate Latexes for Coatings.**

*It saves to formulate with*

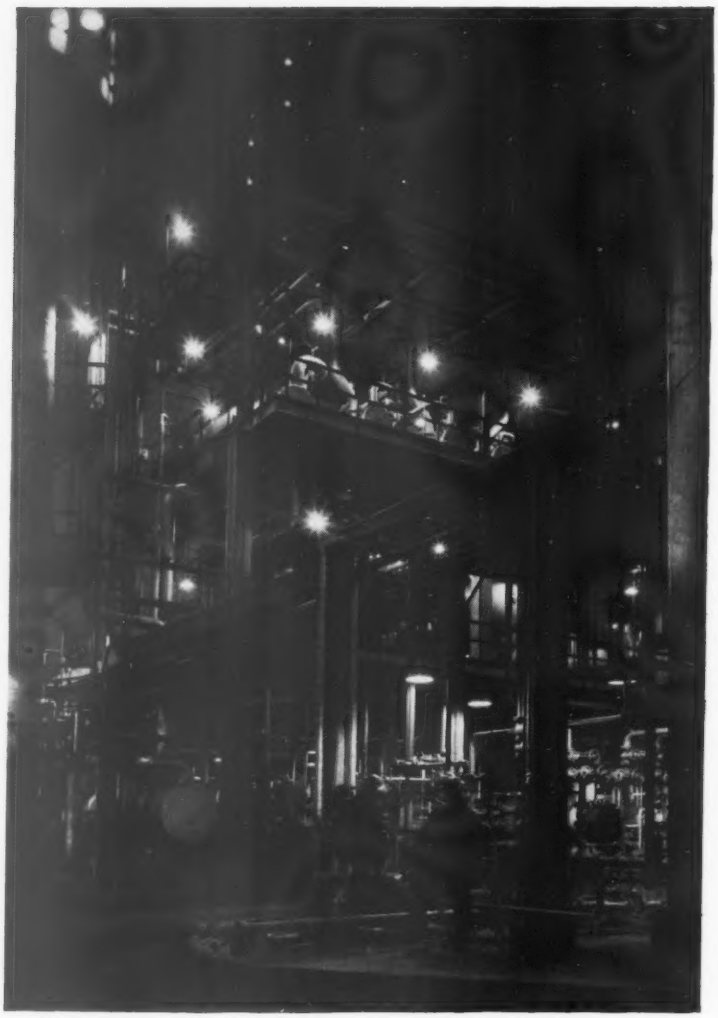
BAKELITE BRAND RESINS for COATINGS

**BAKELITE COMPANY,** *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd St., New York 17, N. Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

# ON-STREAM...DAY AND NIGHT

...to serve
your needs
for SINCLAIR
Toluol, Xylol
and Paraxylene



The Udex extraction unit of Sinclair Refining Company at its refinery at Marcus Hook, Pa., operates on-stream 24 hours a day. Toluol, Xylol and Paraxylene produced from this Udex unit meet important industrial needs for high purity petrochemicals in quantity.

When your manufacturing processes call for fast and reliable service and top quality in aromatic hydrocarbons, Sinclair Chemicals, Inc. is ready to serve you. For complete information call or write to:

## SINCLAIR CHEMICALS, INC.

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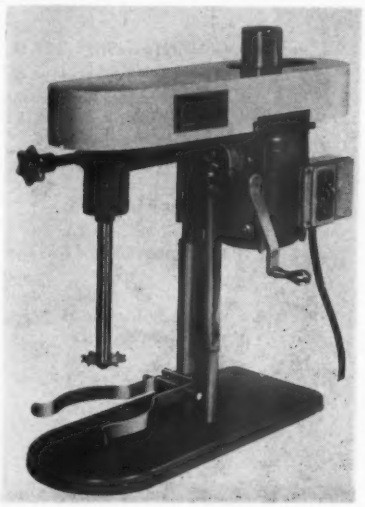
# NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

**This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.**



MOREHOUSE—COWLES

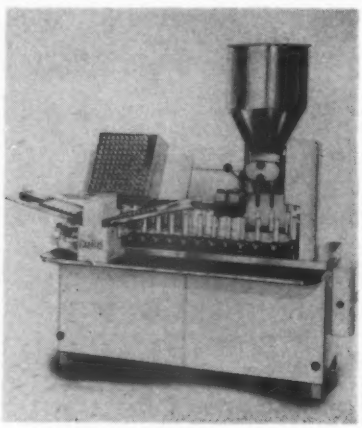
### COWLES DISSOLVER
**Improved Lab Model**

Company announces development of an improved laboratory model of the Cowles Dissolver, featuring a continuously variable range of speeds.

Speeds on the "Model 1-VG" are variable from 1900 rpm to 5900 rpm (with impeller speeds of 1600 to 6150 fpm depending upon the size impeller used). Greater handling speed and convenience are said to have been made possible by a simple speed adjustment knob which eliminates cover removal, belt changes, and sheave change. A speed indicator plate provides for approximate rpm settings. The model is further improved by a heavy duty drive and belt which can pull full load capacity of the motor without slippage or power loss, according to the company. Swift adjustment of impeller height in a 10" range is said to be made practical with an improved screw and gear assembly. Lift screw is covered against contamination, and mounted on a ball bearing for smooth operation. Spindle has been shortened for greater rigidity and less deflection at high speeds. Morehouse-Cowles, Inc., Dept. PVP, 1150 San Fernando Rd., Los Angeles, Cal.

### TUBE FILLING MACHINE
**High Speed**

Filling machine is claimed to feature blowing suction tube cleaning, cap tightening, air-free filling system, photo-electric tube registration, and various optional coding and crimping methods. The Arenco type GAN will handle tubes up to 1½" in diameter and 7¼" long.



ARENCO

A special appliance facilitates semi-automatic tube feeding from carton to channels. Tube feed into holders is automatic. Discharge of tubes can be arranged to suit any method of cartoning. Production of 80 to 100 tubes per minute is claimed by the manufacturer. Arenco Machine Co., Inc., Dept. PVP, 25 W. 43rd St., New York 36, N. Y.

### HIGH SHEAR HOMOGENIZER
**Provides Thorough Blending**

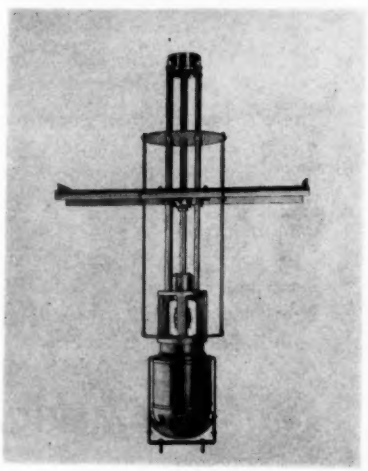
Eppenbach Homo-Mixer is a high-speed, high shear homogenizer which assures fast and thorough blending, according to the manufacturer. A feature of this mixer is its design which minimizes the entry of excessive air and the formation of air vortex in blending operations. This is said to permit the formation of more stable emulsions.

This mixer can be used for blending and homogenizing dispersions, emulsions, pastes or any fluid or semi-fluid material. Has wide application in all processing industries, such as paper, inks, plastics, polishes, paints, etc. Available in a portable or stationary unit. It does not require a high liquid head or any specific mounting angle to give efficient action. Material can be processed at height just sufficient to cover the mixing head, the manufacturer claims.

Both laboratory and production models, with capacities ranging from ¼ to 2,000 gal. are available. Power is supplied by ¼ hp to 25 hp motors, depending on desired blending rate, batch size. Can be supplied with vacuum or open kettles or tanks of single shell or jacketed construction.

Gifford-Wood Co., Dept. PVP, Graybar Building, New York, N.Y.

GIFFORD—WOOD



# The first **completely modern** oblong can . . . the only **solderless** can with all these features!

**NO-DRIP SPOUT**
—another Canco "first." And the neck has an *outward* curl to eliminate raw inside edge.

**CLINCHED NOZZLE**
—this means no solder anywhere . . . no rust from flux splashes . . . a fully lithographed top.

**CEMENTED SIDE SEAM**
—pioneered by Canco, to replace solder. Permits full lithography all the way around the can.

**STACKABLE**
—small recess in bottom of can permits full "stackability" . . . more effective displays . . . easier and better to ship and store.

**FULL ENAMEL INSIDE**
—100% enameling means 100% efficiency for hard-to-hold products.

## For you . . . another CANCO "first"!

**There's not another container** on the market with *all* the features you see above. Yet every one is important if you want to market your product in a truly *modern* container.

If your product is better suited to a *round* can, consider Canco's "Peak-Top" Non-Drip container which is ideal for painting accessories such as primers, linseed oil, turpentine, and thinners.

These are only two of the many containers in Canco's line of paint and varnish cans —the finest and the most complete line of quality cans available.

From this large assortment, you will find the exact container you need to market your product most efficiently. Ask the Canco man!

MEMBER
Packaging Institute
18th Annual Forum
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Hotel Statler
Cleveland, Ohio

CANCO **AMERICAN CAN COMPANY** New York, Chicago, San Francisco

# HERE'S A NEW FILM ABOUT PE QUALITY

Pentaerythritol gets star billing in "The Little Steps"—a new 15-minute, sound and color motion picture recently released by Hercules Powder Company.

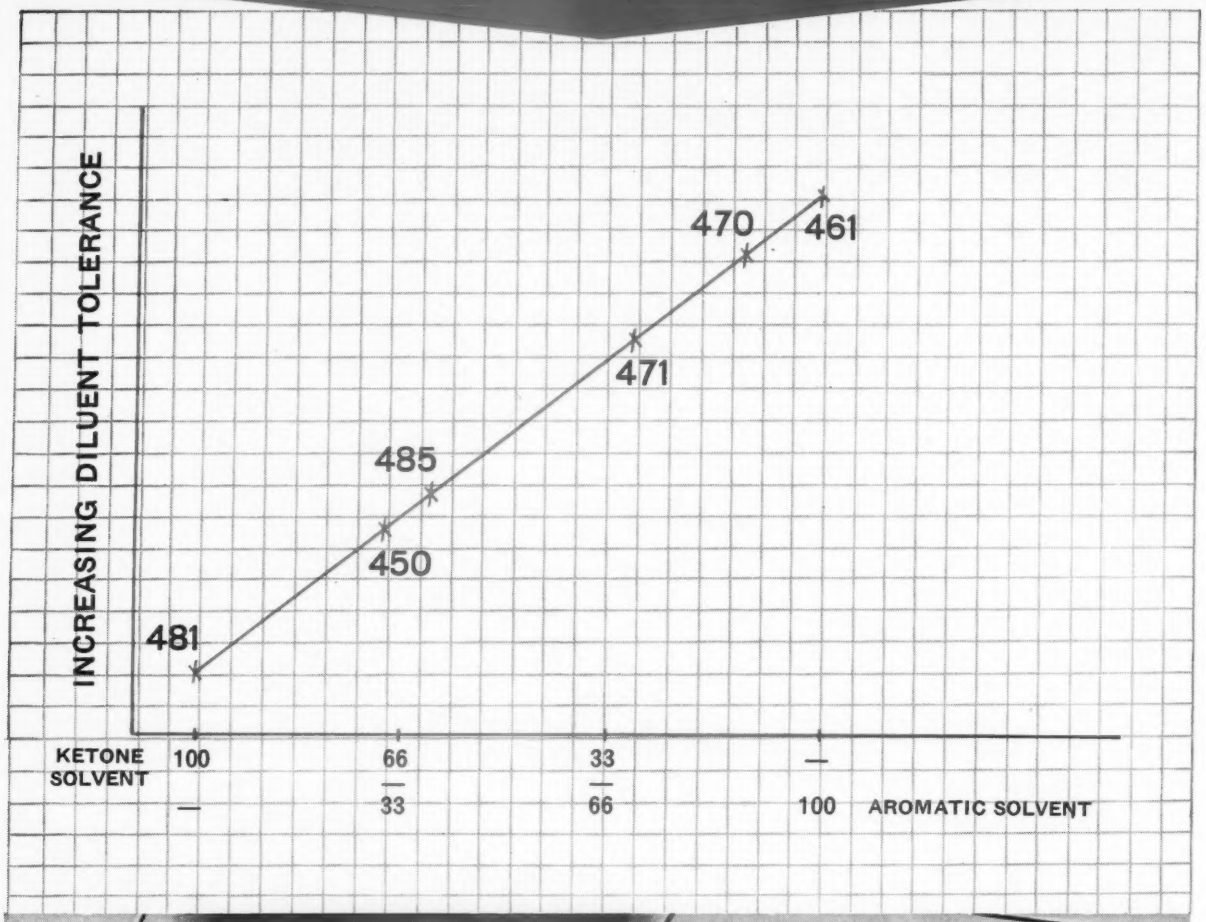
Basically, this film tells the story of chemical progress—the story behind Hercules' improved Technical PE and new Mono-PE. It shows how, through a constant program of basic research and process improvement, a typical chemical material becomes constantly better and more useful to resin and coatings manufacturers.

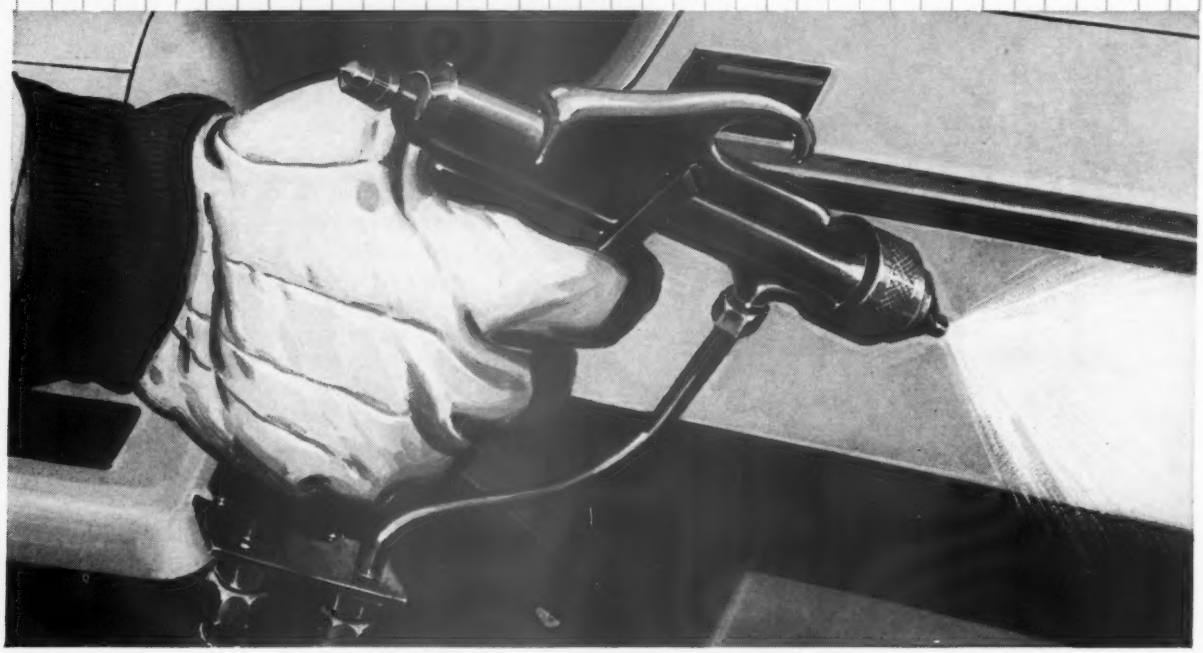
We're sure you'll find this behind-the-scenes glimpse of chemical research in action both interesting and profitable. If you want to schedule a showing either for your own company or for club or school use, contact your nearest Synthetics Department branch office, or write:

*Synthetics Department*
**HERCULES POWDER COMPANY**
INCORPORATED
*926 Market St., Wilmington 99, Del.*

SP56-5

# Pick your proper solution resin...*at a glance!*



# EXON

# solution resins

## 6 *answers to industry's coating problems...*

**EXON** is becoming the engineer's word for versatility. And for comprehensiveness.

In the field of vinyl coatings, for example, consider the 6 Firestone Exon solution resins.

They vary, of course, in properties so that each is ideal for its specific use. Their adhesion factor, for example, is engineered precisely to your needs. But they all dissolve quickly in appropriate solvents, are more resistant to chemicals, abrasion, corrosion and weather.

Details in the listing at right indicate the unusually wide range of applications covered by the 6 Exon solution resins. We believe that among them you will find the engineered answer to your particular coating problem.

**EXON 450**—Ideal for strip coatings. Good solubility, tensile strength and durability.

**EXON 461**—A unique fluorine-containing resin combining high solubility, unusual chemical resistance, heat stability and wearability.

**EXON 470**—Excellent adhesion to metals, alkyd and vinyl surfaces. Compatible with wide range of drying oils, alkyds, phenolics, melamines. High solubility in inexpensive solvents.

**EXON 471**—Excellent for weatherability and durability in a protective coating. Corrosion resistant. No measurable change after sunlamp exposure for 360 hours as 1 mil film.

**EXON 481**—Makes possible colorful, abrasion-proof, washable coatings that resist fading or cracking.

**EXON 485**—For superior strip coatings. Lower viscosity makes application easier and shelf-life better. Good clarity.

Firestone

*For details that will interest you in particular, call or write:*

**CHEMICAL SALES DIVISION**

FIRESTONE PLASTICS CO., DEPT. 630K. POTTSTOWN, PA.

A DIVISION OF THE FIRESTONE TIRE & RUBBER CO.

## *Announcing!* Increased plant capacity on

# Oronite PHTHALIC ANHYDRIDE *plus*

## new, large storage terminals at key national consuming points

Oronite was the original producer of phthalic anhydride from ortho-xylene, a petroleum derivative. Having complete control of the basic raw material, you are always assured of Oronite as a dependable source of supply.

With increasing demands for Oronite PA, manufacturing facilities have been greatly enlarged to assure you product when you need it. And to further provide you quick delivery of phthalic anhydride in molten or flake form, Oronite has set up bulk storage terminals in close-by Eastern centers. Carload prices are obtainable in mixed carloads of phthalic anhydride, maleic anhydride and new isophthalic.

Why not get Oronite's new, up to the minute story on phthalic anhydride? Call or write the nearest Oronite office.

*"Basic Chemicals for Industry"*

**ORONITE CHEMICAL COMPANY**

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Mercantile Securities Building, Dallas 1, Texas 450 Mission Street, San Francisco 5, Calif.
36 Avenue William-Favre, Geneva, Switzerland

ORONITE CHEMICAL COMPANY

3864

## NEW MATERIALS — EQUIPMENT

### RESIN FOR LATEX PAINTS
**Improves Properties**

C-12 is a modifier for the various latices and may be used as a vehicle for resin emulsion paints.

When used with latices, this resin is said to improve adhesion and provide better leveling and flow properties. By replacing 25% of the latex with this resin on a solids basis, improved enamel holdout, stain removal, and washability are obtained.

Other features claimed by the manufacturer by using this resin are: the formulator is able to work at higher PVC levels resulting in improved hiding; formulator has greater choice in selecting extenders, in order to obtain maximum dry hiding with excellent control with respect to porosity and sheen of the paint film.

The manufacturer recommends that C-12 be used in the grinding portion of the paint. This results in good wetting and pigment suspension with improved package stability and freeze-thaw stability. Farnow, Inc., Dept. PVP, 4-80 47th Road, Long Island City 1, N. Y.

### HYDROXYETHYL CELLULOSE
**Improves Latex Paints**

Cellosize hydroxyethyl cellulose WP-4400 is a high viscosity thickening agent, which according to the manufacturer imparts several advantages to latex emulsion paints. Among these are good scrub resistance, prevention of pinholing in the paint film, good brushability, flow out, and leveling, besides enhancing mechanical, freeze-thaw, and viscosity stability.

The producer also claims that this cellulosic material maintains excellent pigment dispersion in latex paints. This means rich colors with a minimum amount of pigment and a paint film with less color variation.

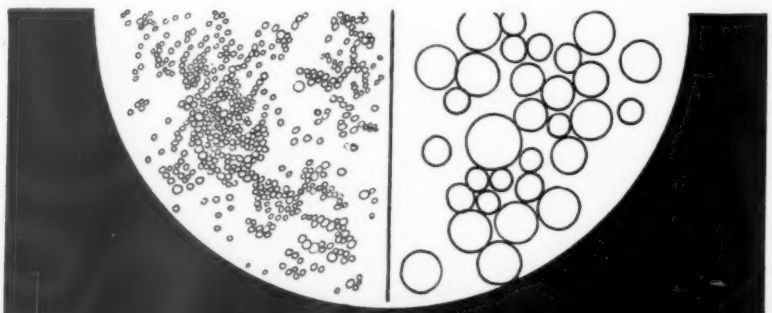
WP-4400 is said to go into solution readily at room temperature and solutions of this material do not gel at temperatures up to the boiling point of water. Carbide and Carbon Chemicals Co., Dept. PVP, 30 East 42nd St., New York 17, N. Y.

### CENTRIFUGAL PUMP
**Leakproof**

Eliminating seals and stuffing boxes, this "Chempump" centrifugal pump can handle Dowtherm, Arochlor, para-Cymene and similar heat-transfer fluids with no leakage, according to the manufacturer. These fluids, notoriously "hard-to-hold" with conventional centrifugal pumps are pumped without leakage at temperatures up to 1000 deg. F., it is claimed.

This unit combines pump and motor in a single hermetic unit. A small portion of the pumped fluid is allowed to circulate in the rotor chamber, providing automatic bearing lubrication. Rotor chamber fluid is isolated from stator windings by a corrosion-resistant, non-magnetic liner, and is cooled by an integrally built heat exchanger. Main pumped fluid temperature is reduced by less than 2 deg F. maximum with the Chempump temperature control circuit.

Available in cast iron, steel and stainless steel, with flanges suitable for 300-pound bolting. Heads range to 195 feet and capacities to 250 gpm. Chempump Corporation, Station 61, Dept. PVP, 1300 East Mermaid Lane, Philadelphia 18, Pa.

*control* **BOTH** *types of foam in latex paint...with*

**NOPCO ANTI-FOAMERS**

Two distinct types of foam – both damaging – occur in latex paints. There is the small, tight bubble produced in manufacturing, and the larger, looser bubble produced upon application. The anti-foamer that controls one type is often much less effective with the other.

And since there are a number of major systems . . . it's clear that eliminating foam from latex paint is far from simple. Yet it must be done . . . and Nopco can help you do it.

Nopco offers so wide a choice of anti-foamers, both paste and liquid, for all three major systems, that our technical men can put the right ones to work for you, and render *both* types of foam virtually a minus quantity in your latex paint. Just write today to Nopco Chemical Company, Harrison, New Jersey.

PLANTS: Harrison, N. J.
Cedartown, Ga. • Richmond, Calif.
London, Canada

NOPCO

## NEW MATERIALS — EQUIPMENT

### LIQUID FATTY ALCOHOL
**High Reactivity**

Liquid fatty alcohol, "Adol 32" has good color stability, low viscosity and high chemical reactivity, according to the producer.

This fatty alcohol is a straight-chain, unsaturated, monohydric alcohol which is essentially oleyl. Chemical reactive groups include one double bond and one hydroxyl group.

At room temperature this fatty alcohol is almost water-white with a mild fatty odor. It is non-corrosive, soluble in a wide variety of solvents, and miscible with fats, fatty acids, petroleum oils and waxes.

Possible applications include: chemical intermediates, resins, plasticizers, emulsifiers, etc. Available in drums or tank cars.

For further information, write to Archer-Daniels-Midland Co., Chemical Products Div., Dept. PVP, 2191 W. 110th St., Cleveland, Ohio.

### FOSSIL RESIN
**Extender for Alkyds**

Resin 510 a fossil resin is again in production. It is 98% hydrocarbon with a molecular weight around 800, and iodine value of from 140 to 150, pH of 6.4 to 6.7 and melting point around 180 deg C.

This resin has been used in oleoresinous varnishes and primers, cold cut vehicles, inks, synthetic rubber adhesives and asphaltic laminants, and as an extender or modifier with alkyds, elastomers, waxes, phenolics, chlorinated rubber and vinyls.

It is characterized by complete solubility in either aliphatic or aromatic hydrocarbons, excellent compatibility with other resins, outstanding alkali resistance, good acid resistance, fast solvent release, excellent water resistance and salt spary resistance.

R-B-H Dispersions, Div. of Interchemical Corp., Dept. PVP, Bound Brook, N. J.

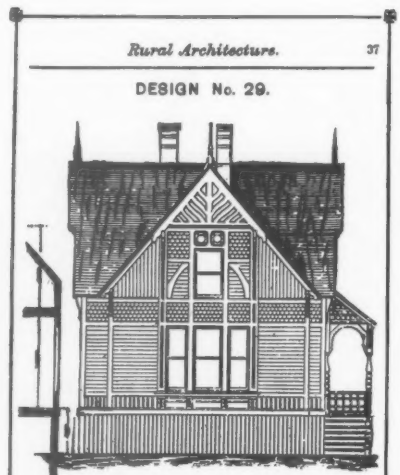
NEW ENGLAND

### UTILITY OVEN
**For Curing and Baking**

Line of utility ovens is recommended for small batch drying, curing, baking, heat treating, product control, etc. Temperature ranges from 100 deg. C. to 1000 deg. C.

Forced air recirculating system is maintained within the oven chamber through use of a fan and controlled intake and exhaust vents. A shielded heating element prevents radiant over-heating and aids in a more even temperature control throughout the chamber. Ovens operate at 110 and 220 volts, but can be modified to conform to any non-standard power supply. New England Oven and Furnace Company, Dept. PVP, Orange, Conn.


**"...and be sure to use an IRON OXIDE brown."**




TAKE A drive through the countryside... You'll see homes like this still trim, still lived in—though their gingerbread styling tells you they are 50 to 75 years old!

To protect these buildings' wood exteriors from constant beatings by summer sun and winter rain, their owners used browns made with weather-resistant iron oxides.

For 101 years, REICHARD-COULSTON iron oxides have gone into the paints that helped keep these sturdy old homes fresh and livable—just as they do the modern homes of today. In step with advances in the paint industry, REICHARD-COULSTON today makes 13 popular synthetic browns ranging from light chestnut to dark chocolate. These synthetic products are valued for their rich shades, fine particle size and ease of dispersion and are designed for use in all type vehicles and dispersion equipment available to the paint technician. They are used by manufacturers for all rich brown finishes requiring maximum coverage and tinting strength.

REICHARD-COULSTON colors such as our ERCO RECO and Chestnut Browns can help *your* production. For free laboratory samples and technical data, write today.

Natural IRON OXIDE PIGMENTS Synthetic

**Reichard-Coulston, Inc.**

15 EAST 26th STREET, NEW YORK 10, N. Y.

Warehouses in principal cities. Factory: Bethlehem, Pa. Over a century of manufacturing and service.

## NEW MATERIALS — EQUIPMENT

### REPAIRING COMPOUND
**For Tanks**

The hazards involved in making welded repairs to metal tanks, pipes, and conduit, especially where flammable materials are being handled is said to be overcome by using a newly developed filled epoxy resin material called "Sonite" and glass cloth.

Product is claimed to have great chemical stability and good adhesion to metals; it is oil and waterproof, resists acids and alkalis, and is said to withstand temperatures to 200° F. It is available in white, designated as "Sonite P-2," and aluminum, designated as "Sonite P-5." Smooth-On Mfg. Co., Dept. PVP, Jersey City 4, N. J.

### HEATING COIL
**Immersion Type**

Heating coil of new design to take the place of old-fashioned pipe coils is claimed to heat the contents of drums more efficient, more economical, and better in every respect. This unit can be used for steam or other heating; also for cooling. This unit weighs much less than pipe coil and is easily put in the drum by hand; also can be clamped on a drum for outside heating. This heating unit consists of two sheets of metal with suitable embossing which are welded to from the necessary flow channels. Available in mild steel, or stainless steel, and in other metals for different conditions and services. For complete details contact Dean Thermo-Panel Coil Div., Dean Products, Inc., Dept. PVP, 616 Franklin Ave., Brooklyn 38, N. Y.

### UREA COMPOUNDS
**Inert Solids**

Two substituted urea compounds p-chlorophenyl-1 and 3,4-dichlorophenyl-1, 1-dimethylurea are relatively inert solids at room temperatures. Suggested polymers are urea-formaldehyde, melamine, and phenol-formaldehyde. Grasselli Chemicals, E. I. du Pont de Nemours & Co., Dept. PVP, Wilmington, Del.

### GELOMETER
**Accuracy Within 1%**

Precision-Bloom Gelometer has application in testing of certain paints, according to the manufacturer. Principle of operation is simple yet accuracy is within ± 1%. A plunger is lowered a pre-determined distance into the product being tested. The force applied to the plunger to drive it against the resistance of the test product is a direct measure of the product's strength. Results are reported in grams. Precision Scientific Co., Dept. PVP, 3737 W. Cortland St., Chicago 47, Ill.

### LEAD FREE ZINC OXIDE
**Higher Apparent Density**

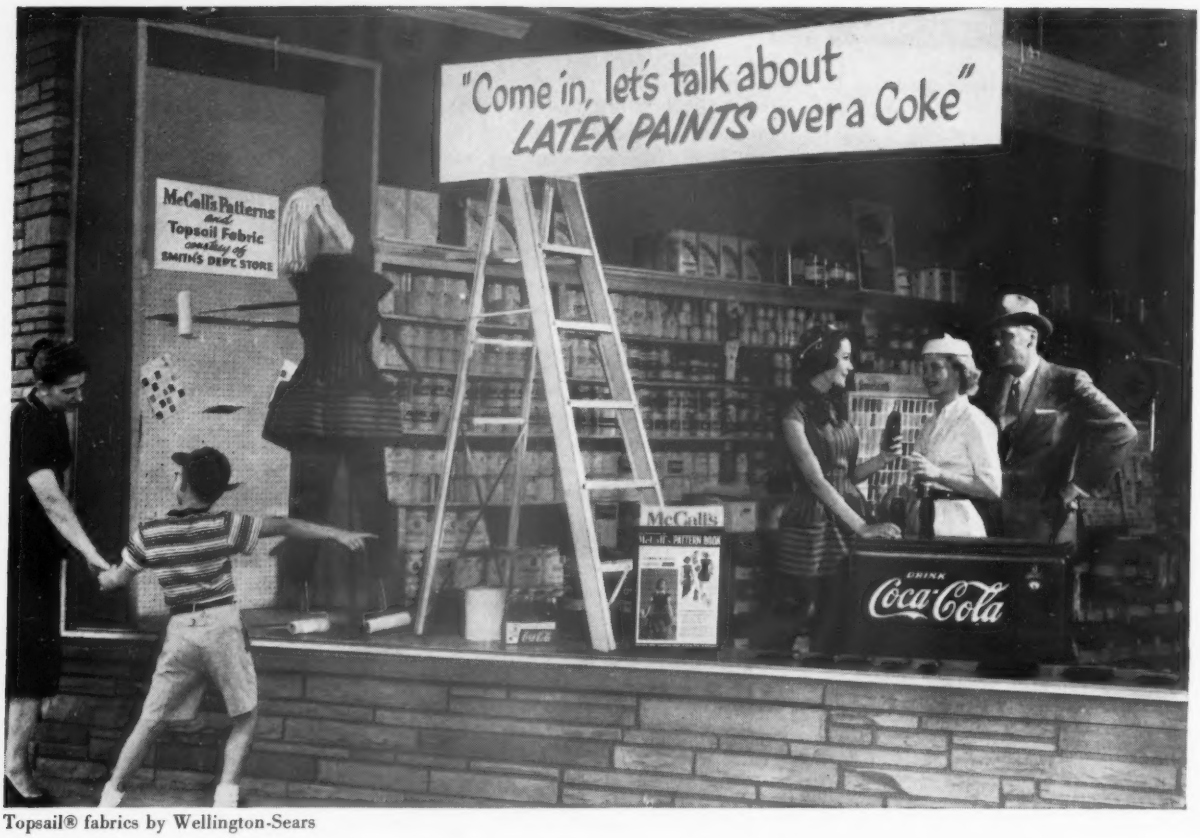
"Azodox" is a lead free zinc oxide pigment having a higher apparent density, which the manufacturer claims requires only half of the storage space as conventional zinc oxides needs. Another advantage claimed for this particular zinc oxide is the fact that it mixes, incorporates, and disperses faster in paint vehicles, with resultant savings in costs. It also flows more freely and is less dusting than ordinary zinc oxides. Samples and test lots for factory trial are available. American Zinc Sales Co., Dept. PVP, Columbus, Ohio.

This guaranteed paint deodorant has *proved* its complete effectiveness in thousands of gallons of paint, varnish, enamel, lacquer thinners and other similar types of products.

- **Maskit #2 makes your paint *preferred* by painters, home owners, industry and institutional men.**
- **It masks the odor in the can while paint is being applied — during — and after — the drying period.**
- **It does not affect drying time or color durability.**

**Amazingly economical, 1 lb. of Maskit #2 deodorizes 150 gallons of paint. Why not order a trial pound today and make your own tests! $1.50 lb.**

**AROMATIC PRODUCTS, Incorporated**
**235 Fourth Avenue, New York 3**
**CHICAGO • DALLAS • MEMPHIS • PITTSBURGH • LOS ANGELES • BOSTON**


"Come in, let's talk about LATEX PAINTS over a Coke"
McCall's Patterns and Topsail Fabric courtesy of SMITH'S DEPT. STORE
McCall's
DRINK
Coca-Cola

Topsail® fabrics by Wellington-Sears

# DOW offers new idea to boost LATEX PAINT sales

## *Coca-Cola and McCall's Patterns tie in for unique promotion*

**All told, there are five famous names at work to boost latex paint sales at the dealer level this fall—Dow, Coca-Cola, McCall's Patterns, Wellington-Sears Fabrics, and *your own brand name.***

**COCA-COLA**®—Think what this name can do to increase store traffic! And every Coke® bottler is briefed on working with paint dealers on a "Come in and talk latex painting—over a Coke" week.

**McCALL'S PATTERNS**—See the new pattern for a painting costume every woman will love! It's specially designed for latex painting—smart Capri pants and apron, with an Appli-Press® latex paint design. Seventeen McCall's Retail Representatives will stimulate prominent window display areas. They will sell the promotion, help set up windows and in-store displays.

**WELLINGTON-SEARS** famous fabric "Topsail"® is featured for the new latex painting costume.

**YOUR DEALERS** will find these tie-ins make a promotion that means business—ads, commercials, mailings, displays, premiums, stunts, "weeks"—the possibilities are unlimited.

**YOU**—Investigate the advertising helps, the photographs, the window display suggestions—the many ways Dow helps assure success for you. But act now. Contact your Dow representative for details.

**38 MILLION ADVERTISING IMPRESSIONS!**

Dow is launching a big ad campaign, featuring this promotion. Two-color ads will appear in McCALL'S, BETTER HOMES & GARDENS, AMERICAN HOME, THE SATURDAY EVENING POST, LIVING FOR YOUNG HOMEMAKERS, HOUSEHOLD, SUCCESSFUL FARMING. Total: over 38 million advertising impressions during September, October, November! Publicity stories will be released to newspapers, radio and TV stations September first. This latex promotion will be a feature of the Eddie Fisher TV Coke Time program in October. The idea is big. The possibilities are big. Make your sales big. Make all five big names work for you.

**For further information and material write Plastics Sales Dept. PL 567L, THE DOW CHEMICAL COMPANY, Midland, Michigan.**

LATEX T.M.

*you can depend on DOW PLASTICS*

DOW

# NEWS

## R. R. Willman Tech. Dir. Of National Testing Co.

Formation of the National Testing Co., 709 Mattison Ave., Asbury Park, N. J., has been announced. The company will serve independent paint manufacturers by evaluating raw materials and by the development of new products and formulations.

Roland Robert Willman has been appointed technical director of the new company. He has been working in product development for the National Lead Co. for the past five years, and prior to that had experience covering federal and state specification finishes, latex emulsions, baking, industrial, wrinkle and marine paints.

Mr. Willman is a member of the New York Production Club and has worked on the Technical Sub-Committee on Dispersions.

•

## Y. Pigment Club Opens 1956-57 Season Sept. 13

The opening meeting of the New York Pigment Club for the 1956-57 season will be held Sept. 13. Speaker for the evening will be Aaron Permut, consulting chemist and director of Solitone Laboratories, whose subject will be, "The Pigment Manufacturer's Role in Textile Printing."

In honor of the Perkin Centennial Celebration which will be held during the same week, members of the Dry Color Manufacturers Association have been invited.

The meeting, to be held at Fraunces Tavern, Broad and Pearl Streets, will also be open to all others attending the Centennial who have an interest in the pigment printing of textiles.

•

## Paint Technologist in Italy

Immanuel H. "Dutch" Johnson, paint technologist for the past year with the Technical Cooperative Mission in India, has taken a leave of absence for four months to serve again, for that period of time, as technical adviser to Industrias Vernices Italiana.

## Du Pont Begins Expansion Of "Lucite" Production

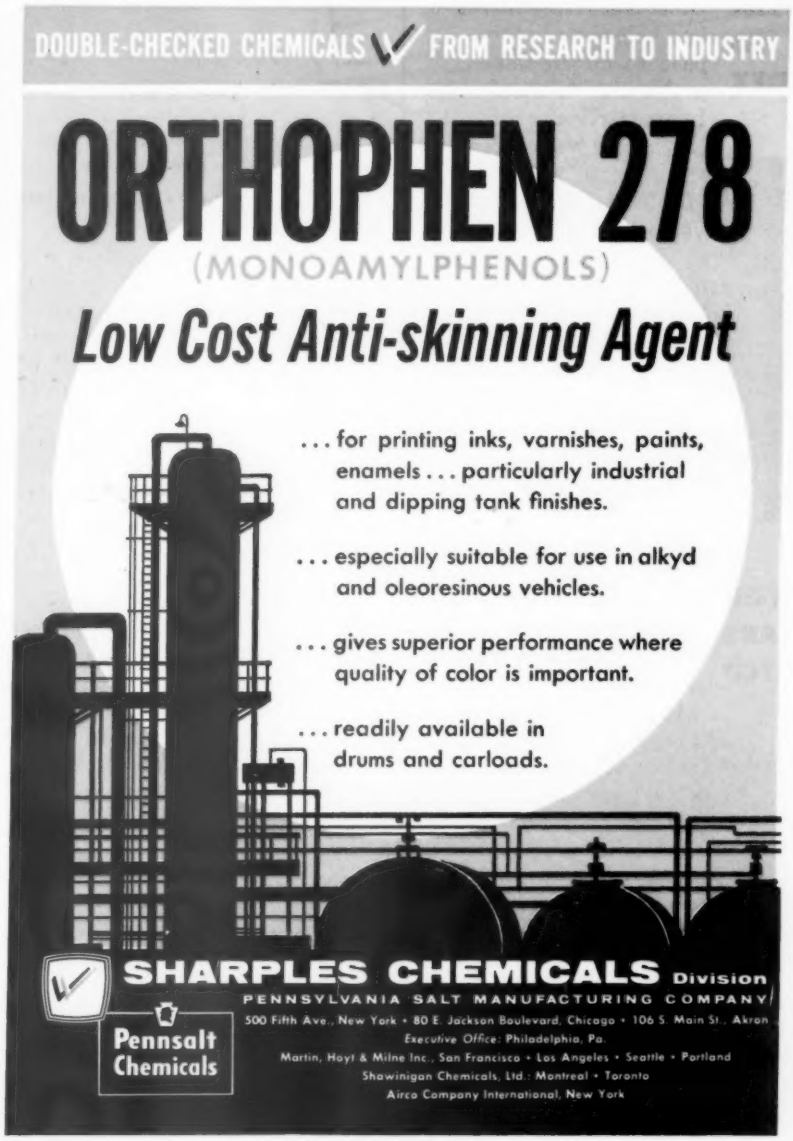
Expansion of production facilities for methyl methacrylate monomer, the raw material for "Lucite" acrylic resin products, is under way at Du Pont's Belle Works, near Charleston, W. Va., it was announced by the company.

The project, which will double Du Pont's capacity for manufacturing methyl methacrylates, is expected to be completed in about two years.

According to Du Pont, forecasts of wider markets for all acrylic products in the next several years accounted for the decision to expand methacrylate capacity.

Among the products for which greater demand is expected are "Lucite" molding powders, "Lucite" granular polymers for the extrusion of plastic sheet and shapes, and "Lucite" resin compositions used in dental applications.

In addition, extensive markets are forecast for the new "Lucite" acrylic automobile paints, developed by Du Pont chemists for use on a limited scale in 1956. The new paints are said not to weather and chalk as rapidly as conventional finishes, and as a result, stay bright three times longer and need less polishing.



DOUBLE-CHECKED CHEMICALS FROM RESEARCH TO INDUSTRY
ORTHOPHEN 278
(MONOAMYLPHENOLS)
Low Cost Anti-skinning Agent
... for printing inks, varnishes, paints, enamels ... particularly industrial and dipping tank finishes.
... especially suitable for use in alkyd and oleoresinous vehicles.
... gives superior performance where quality of color is important.
... readily available in drums and carloads.
SHARPLES CHEMICALS Division
PENNSYLVANIA SALT MANUFACTURING COMPANY
500 Fifth Ave., New York • 80 E. Jackson Boulevard, Chicago • 106 S. Main St., Akron
Executive Office: Philadelphia, Pa.
Martin, Hoyt & Milne Inc., San Francisco • Los Angeles • Seattle • Portland
Shawinigan Chemicals, Ltd.: Montreal • Toronto
Airco Company International, New York
Pennsalt Chemicals

**WE HAD A PROBLEM** Our line featured an exterior house paint, which was considered *extra good*. However, from time to time, we had a complaint. In as little as six months—here and there—some owner or painting contractor or retailer was reporting that his prize job looked "dirty."

**WE WENT TO NUODEX** Other Nuodex Additives had helped us in the past, so we put this problem up to Nuodex. In our particular case, the answer was *mildew;* the solution: 0.5% Super Ad-It®. This problem being solved, we then discovered that Nuodex also had available to us—at or below cost—several important dealer helps. These ranged from can cards to factual 4-page reports on Mildew, to envelope stuffers.

**YOU ARE INVITED** Nuodex invites you to call upon them for cooperative research on any paint problem—whether in current production or in new formulas, new vehicles, new developments of any type. This cooperative approach has proved mutually valuable on many occasions—an improved product for the paint manufacturer—another satisfied customer for Nuodex.

NUODEX PRODUCTS COMPANY
342 MADISON AVE., NEW YORK 17, N.Y.
A DIVISION OF HEYDEN CHEMICAL CORPORATION

## MODERN TREND IN WAX FORMULATIONS

(*From page 39*)

A – *Self-Polishing Base*

| | |
|---|---|
| Duroxon J-324 | 66 lbs. |
| AC polyethylene 629 | 17 lbs. |
| Microcrystalline Wax (185-190°F) | 17 lbs. |
| Oleic acid | 10 lbs. |
| Morpholine | 10 lbs. |
| Borax | 8 lbs. |
| Water | 722 lbs. |
| | 850 lbs. |

B – *Leveling Resin*

| | |
|---|---|
| Loba C gum | 115 lbs. |
| Ammonia (28%) | 38 lbs. |
| Water | 697 lbs. |
| | 850 lbs. |

*Final Composition*

| | |
|---|---|
| A – Self-polishing base | 85-80 parts by volume |
| B – Leveling resin | 15-20 parts by volume |

**Table IX. Formulation of Self-Polishing Wax**

cussing advances in medical science, once said that such discoveries usually go through three stages. First, when the discovery is announced, people declare that it is untrue. Second, when its truth can no longer be disputed, they say, "Well, it is not very important." Finally, after a lapse of time, when its importance has become quite apparent, many of the same people say, "But there is nothing new about it. It is old stuff."

It could very well be to some of you, that a portion of the subject matter discussed today is old stuff. However, it was Oliver Wendell Holmes who said, "It is frequently much more important to emphasize the obvious than to elucidate the obscure."

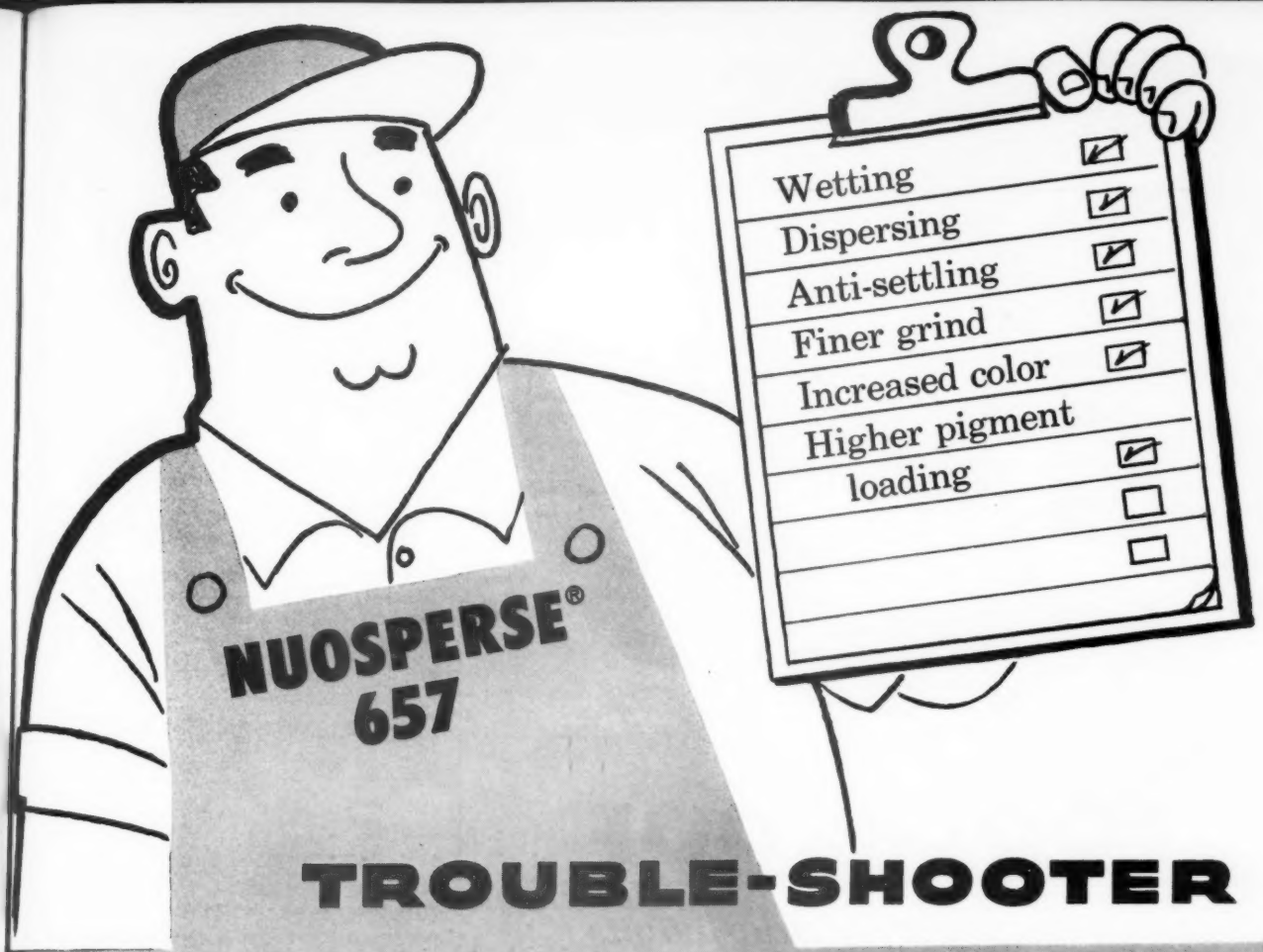
So, then, summarizing briefly—today's floor wax is entirely different, in many instances, from the one merchandised about ten years ago. The availability of promising new raw materials, some of which were discussed today, has definitely accelerated new trends in floor wax formulations. Current developments and scientific achievements will insure that this modern trend in better floor wax formulations will continue in the future.

**Suppliers of Raw Materials Mentioned**

| | |
|---|---|
| Duroxon, FT Waxes | – Dura Commodities Corporation, New York, N.Y. |
| AC Polyethylene | – Allied Chemical & Dye Corp., Semet-Solvay Petrochemical Div., New York, N.Y. |
| 3-Methoxypropylamine | – American Cyanamid Company, New York, N.Y. |
| Durez Resins | – Durez Plastics & Chemicals, Inc., North Tonawanda, New York |
| Shanco Resins | – Shanco Plastics & Chemicals, Inc., Tonawanda, New York |
| Piccopale Resins | – Pennsylvania Industrial Chemical Corp., Clairton, Pennsylvania |
| Amberol Resins | – Rohm & Haas, Philadelphia, Pa. |
| Lustrex Latices | – Monsanto Chemical Company, Springfield, Mass. |
| Darex Latices | – Dewey & Almy Chemical Co., Cambridge, Mass. |
| Geon Latices | – B. F. Goodrich Chemical Company, Cleveland, O. |
| Pliolite Latices | – Goodyear Tire & Rubber Co., The Chemical Div., Akron, Ohio |
| Vinac Polymers | – Colton Chemical Co., Cleveland, Ohio |
| Rhoplex Latices | – Rohm & Haas, Philadelphia, Pa. |
| Elvalan Vinyl Polymer | – E.I. Du Pont de Nemours & Co., Wilmington, Del. |
| Loba C. Resin | – William H. Scheel, Inc., Brooklyn, N.Y. |
| Emulphogene AM-870 | – Antara Chemicals Sales Div. of General Aniline & Film Corp., New York, N.Y. |

**References**

1. Schwarcz, L., Sanitary Products, p. 112
2. CSMA First Annual Product Survey, Waxes and Floor Finishes
3. Kroner, A. A., Soap and Chemical Specialties, p. 163, Nov., 1955
4. Marsel, C. J., Soap and Chemical Specialties, Feb., 1955
5. Pamphlet, Semet-Solvay Petrochemical Div. of Allied Chemical & Dye Corp.
6. Pamphlet, American Cyanamid Co.
7. Wax Facts, Vol. 1, No. 2, June, 1955, Dura Commodities Corp.
8. L. H. Perry, R. S. Sweet, Proceedings, The 40th Mid-Year CSMA, p. 128, May, 1954
9. Weirich, C. L., Modern Sanitation, p. 24, Sept. 1955




# TROUBLE-SHOOTER

## for pigment-vehicle problems

NUOSPERSE 657 is an agent of many talents in the field of paint formulations. It does *more* jobs than any similar agent tested by some three hundred paint manufacturers—and does them well! Nuosperse 657 has been used in various paint formulations successfully to

—**overcome settling** in industrial primers

—**improve fineness and increase pigment loading** in a red oxide-alkyd

—**obtain faster, finer grinding and better color development** in an odorless enamel

—**convert a roller-mill paste** to a ball-mill paste with better fineness and equal tint

—**reduce the milling** of a phthalocyanine blue in an alkyd vehicle from two passes to one, and gain a finer grind and better color development at the same time.

For wetting, dispersing, anti-settling, and scores of other paint problems—it pays to have a trouble-shooter like Nuosperse 657 on your floor, *before* production breaks down. The simple fact is that it has successfully handled cases where only long research could have found another solution—and where the value of Nuosperse 657 was previously unknown.

If you'd like to test Nuosperse in your current formulations we will gladly send a sample, along with complete technical data. Please contact your Nuodex Representative or write us direct.

**NUODEX ADDITIVES**

**NUODEX PRODUCTS COMPANY...342 MADISON AVENUE, NEW YORK 17, N. Y.**

**A Division of Heyden Chemical Corporation**

***Every day for 36 years*** the records have been taken at National Lead's Experimental Test Station, Sayville, L. I. . . . the weather, hour-by-hour . . . solar radiation . . . the chemistry of the air . . . the condition of thousands on thousands of paint samples. Today, on 2½ miles of test fence, more than 30,000 exposure tests are active.

# FOOLPROOF

## *your exterior paints with Dutch Boy® "45X"*

***(Basic Silicate White Lead)***

Want an extra leeway of safety against complaints? . . ."Use lead," say makers of exterior paints.

But thousands of exposure panels at Sayville, National Lead's Experimental Station go one step further. They *prove* you need lead for *uniform* performance. Prove, too, that "Dutch Boy" Basic Silicate White Lead "45X" *assures* uniform performance . . . makes exterior paints virtually foolproof, able to handle wide variations in application and service conditions.

In white House Paints, for instance, "45X" insures good self-cleaning. Preserves film integrity, as well.

In tinted House Paints, Dutch Boy "45X" increases film durability and maintains color uniformity.

In Primers, "45X" strengthens adhesion . . . helps keep the bond strong by resisting water.

Paint after paint, it's the same story . . . uniform performance . . . fewer complaints. With "45X," the time and cost of answering complaints goes down. Talk against your paints . . . talk you may not hear . . . fades away. Good will, repeat business comes your way.

### *Cost is lower, too*

You actually need fewer pounds of "45X." For in "45X" the reactive portion of each pigment particle is concentrated at the surface. Pound for pound, *more* lead is available than in other white leads.

No question about it. If you want to cut complaints, step up quality and save money, "Dutch Boy" Basic Silicate White Lead "45X" is the lead to use in exterior paints.

**National Lead Company**: New York 6; Atlanta; Buffalo 3; Chicago 80; Cincinnati 3; Cleveland 13; Dallas 2; Philadelphia 25; Pittsburgh 12; St. Louis 1; San Francisco 10; Boston 6 (National Lead Co. of Mass.). In Canada: Canadian Titanium Pigments Ltd., 630 Dorchester St., W., Montreal.

# PERSONNEL CHANGES

F. A. Jolles

H. R. Helbig

G. C. Sweet

Sam Gurley, Jr.

## REICHHOLD

**Dr. Fred A. Jolles, Herbert R. Helbig, George C. Sweet** and **Sam Gurley, Jr.,** have been named vice presidents.

Dr. Jolles, who has been named vice president in charge of the foreign division, and is also a member of the board of directors, has been officially connected with RCI since 1938 although he has been a legal adviser to the Reichhold family since 1913. He has been manager of the export division, and manager of the foreign division handling legal, patent, trademark, financial and related matters in the U. S. and abroad. He will continue to handle these duties in his new post.

Mr. Helbig, who has been with RCI since November, 1945, is now vice president in charge of the export department. From 1945 until 1950 he was in the technical sales service department of the company's Ferndale plant. Subsequently he was transferred to the Detroit plant and from there to Charlotte, N. C. In September, 1954, he came to the executive offices in White Plains as product sales manager on water soluble urea-formaldehyde resins and a year later was made general manager of the export department which he will continue to supervise under his new title.

George C. Sweet, vice president in charge of purchases, has been with RCI since April, 1947, when he joined the company as assistant export manager. He became export manager in 1952 and in October of that year was named assistant to the vice president in charge of purchases. Afterwards he was transferred to central purchasing being made director of purchases in August, 1955.

Sam Gurley, Jr., vice president in charge of sales development, has had his business experience exclusively in the plastics industry. In 1943 he joined Durez Plastics and subsequently went to the chemical division of the Borden Co. as sales manager, and was later with the Barrett Division of Allied Chemical & Dye Corp. as general sales manager of plastics and resins. In September, 1954, he came to RCI and within a short time was named sales and promotion assistant to the chairman of the board. Until his latest promotion he continued as sales and promotion assistant to Mr. Reichhold.

## ALKYDOL LABORATORIES

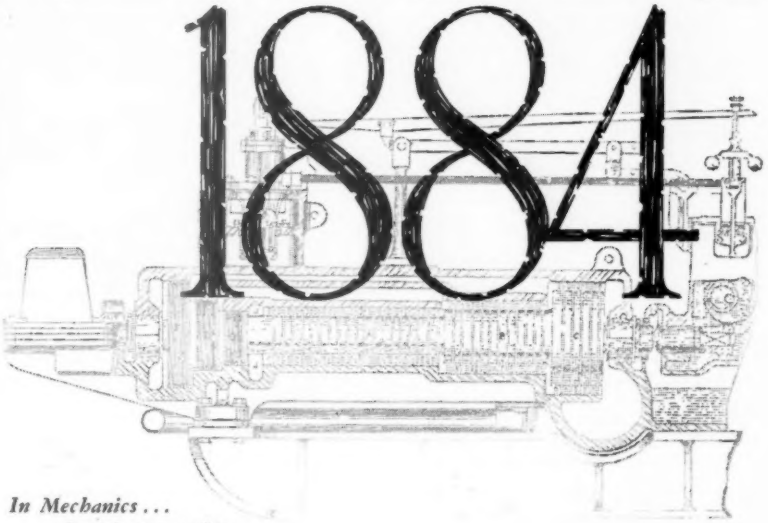
**Harwood J. Cranston** has been appointed manufacturers' representative for the Tri-State area. This includes northern West Virginia, western Pennsylvania and eastern Ohio. He will headquarter in Sewickley, Pa. Mr. Cranston was last associated with Chase Chemical Corp. as sales manager.

## WET GROUND MICA ASS'N.

**George Davenport,** treasurer-sales manager of the Franklin Mineral Products Co., Brighton, Mass., has been elected president of the Wet Ground Mica Association, Inc., succeeding Marshall McAnerney of the Richmond Mica Corp.


*Important dates in the History of Industrial Progress*

1884



*In Mechanics . . .*

*Parson's steam turbine, seen here in a longitudinal diagram, was the first step toward the huge turbines that supply motive power to generators in today's power plants.*

**In the history of fats and waxes**

*Hübl proposed a method for determining the amount of unsaturation of fatty acids by measuring their iodine absorption. The WIJS method in general use today for determining iodine value is a modification of Hübl's procedure. It is widely used to determine the suitability of a fatty acid for a given application.*

For alkyd resin manufacturers, the exceptionally high iodine value for GROCO 20 LINSEED FATTY ACIDS means a high degree of unsaturation, hence greater production economy. In addition, GROCO 20 meets the most critical specifications for minimum color and chemical change under heat.

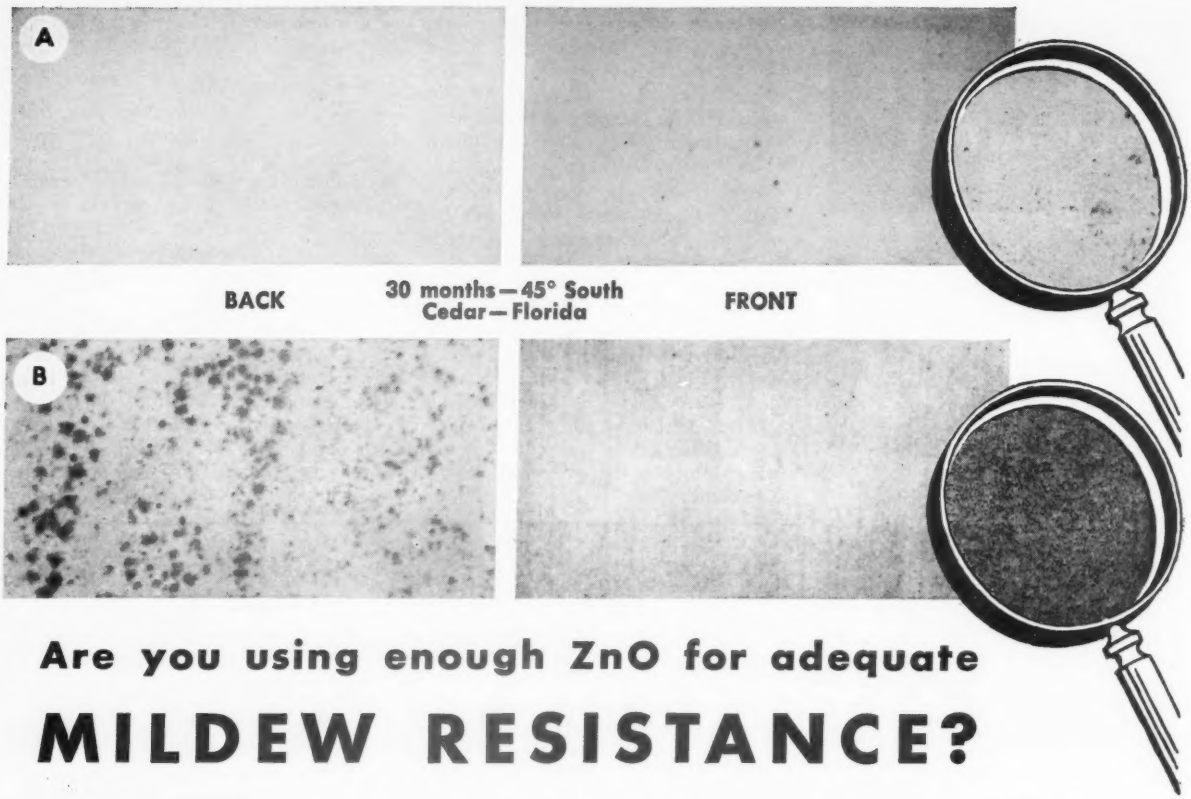
Send for samples and catalog "Fatty Acids in Modern Industry."

**GROCO 20 — LINSEED FATTY ACIDS**

| | |
|---|---|
| Titre | 15° – 20° C. |
| Color 5¼" Lovibond Red | 2.5 max. |
| Color 5¼" Lovibond Yellow | 20 max. |
| Unsaponifiable | 1% max. |
| Saponification Value | 199 – 203 |
| Acid Value | 198 – 202 |
| Iodine Value | 175 – 185 |

**A. GROSS & COMPANY**

295 Madison Avenue, New York 17, N. Y.
Factory: Newark, N. J. Distributors in Principal Cities
*Manufacturers Since 1837*




## Are you using enough ZnO for adequate

# MILDEW RESISTANCE?

The cedar panels above are coated with conventional (linseed oil vehicle) exterior paints. The only difference: the zinc oxide content in the pigment of paint B has been reduced 44.5% ... from 2.7 to 1.5 pounds per gallon.

The result? Panel A is not seriously affected by mildew after 30 months exposure. Panel B shows extreme mildew deterioration – too little Zinc Oxide to meet specific local conditions.

The qualities which are imparted to any good paint by adequate quantities of zinc oxide are well known ... and time-proved. But, in balancing a formulation, zinc oxide levels may be cut too far for customer satisfaction. With this in mind, consider:

**Are you formulating your paints for maximum possible quality?**

**Are you formulating your paints with enough zinc oxide?**

## ENOUGH ZINC OXIDE GIVES YOUR PAINT ...

- **Mildew resistance**
- Durability
- Opacity to ultra-violet light
- Tint retention
- Self-cleaning action

Technical reports are now being prepared by member laboratories of AZI on the benefits of proper zinc oxide usage. To receive copies of these reports, mail coupon.

AZI

**AMERICAN ZINC INSTITUTE, INC., Dept. B**
**60 East 42nd Street, New York 17, N. Y.**

**Please send me future reports on paint formulation findings.**

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

**van AMERINGEN-HAEBLER**

**Chester F. Smith** has been elected to the board of directors, it was announced by Charles P. Walker, president of the company. Mr. Smith was formerly president of Esso Standard Oil Co., and is a director of Standard Oil Co. (New Jersey), where he had served as vice president and member of the executive committee.

C. F. Smith

He has long been active in the American Petroleum Institute, having served as vice president of the refining division in 1949 and 1950.

**TAMMS INDUSTRIES**

**E. E. Troyer** has been elected president of the corporation. He joined the company in March of 1934, and in January 1944 was made vice president. In January of 1945 he was advanced to executive vice president. The board also appointed **Mrs. Frieda Gerretson** treasurer and **H. P. C. W. Barber** secretary.

**CROWN CORK & SEAL**

**Karl W. Mueller** has been named vice president and director of manufacturing, it was announced by Russell Gowans, president.

In his new position, Mr. Mueller will be responsible for directing and coordinating the manufacturing operations of all thirteen of the company's plants located throughout the U. S. He will make his headquarters in the company's Baltimore home office.

Mr. Mueller's experience in plant operations and in related fields of engineering covers twenty-five years, beginning with his employment as a cadet engineer with the Brooklyn Union Gas Company in 1932. Before joining Crown, Mr. Mueller was vice president of operations of Trailmobile, Inc., a subsidiary of Pullman, Inc. Prior to that, he was works manager for three Reading, Pa., operating divisions of American Chain & Cable Co. Earlier, he served as works manager of the Standard Stoker Co., Inc., of Erie, Pa.

**ARTHUR D. LITTLE**

**William A. W. Krebs, Jr.,** has been elected vice president. He is a member of the Massachusetts and New York Bars, and presently represents Arthur D. Little, Inc. as a director and secretary of its affiliate, Nuclear Metals, Inc. He has served the company as a consultant in the general area of his professional field. He will continue as visiting associate professor at the M.I.T. School of Industrial Management where he has been a member of the faculty since 1953.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## MOREHOUSE-COWLES

**Hugh F. Purcell** has been appointed to the newly created post of applications engineer, it was announced by D. L. Grubbs, general manager.

H. F. Purcell

Mr. Purcell, for ten years technical director of Cowles Company of Cayuga, N. Y., joins the staff of the Los Angeles headquarters of Morehouse-Cowles and will work directly with field representatives and clients. In his new position, he will aid industry in designating process equipment to meet the exact needs of the user, and will determine methods of application of the mills and dissolvers in solving special problems of processing.

## COMMERCIAL SOLVENTS

**Eugene M. Seidel** has been appointed western manager for the market development department, it was announced by Dr. F. E. Dolian, manager of the department, a unit of the petrochemicals division.

Mr. Seidel, until recently midwest field representative, will make his headquarters at the company's district office in San Francisco.

Replacing Mr. Seidel at midwest field representative will be **Marion E. Tislow,** who will be located at Terre Haute, Ind. Mr. Tislow has been associated with Commercial Solvents since 1951, and most recently served in the technical service section of the market development department.

The following appointments to the sales staff of the industrial chemicals department were announced by F. E. Maple, general manager of the department, a unit of the Petrochemicals Division.

**I. John Wansik** was named manager of the Cincinnati district. Mr. Wansik was previously a sales representative at the company's Chicago district office.

**Charles B. Mead** has been assigned to the Cleveland district as a sales representative.

**Henry W. George** has been assigned to the Los Angeles district.

**W. J. Fowler** will be the resident salesman in Houston, Texas, reporting to the New Orleans district office.

**Richard K. Hopkins** has been assigned to the New York district office.

## AIR REDUCTION CHEMICAL

**R. A. Wilson** has been appointed manager of operations for Air Reduction Chemical Co., it was announced by C. J. McFarlin, president. Air Reduction Chemical Co. is a division of Air Reduction Co., Inc.

## SCHENECTADY VARNISH

**Donald D. Howell** and **Philip H. Groggins, Jr.,** have been appointed technical representatives.

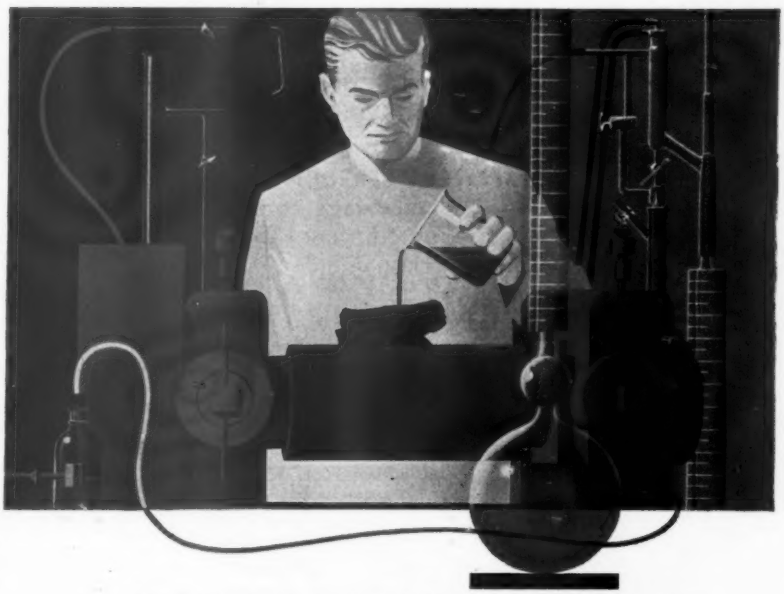
Mr. Howell will service customers in the greater New York and Pittsburgh areas. Prior to this appointment, he was head of the paint applications laboaratory for Celanese Corp., and for a number of years before that he was in charge of technical service in the midwest for Reichhold Chemicals Corp.

Mr. Groggins will handle sales of the firm's broad line of industrial resins and varnishes throughout the midwest. Prior to this appointment, he was a sales development supervisor located at company headquarters in Schnectady, N. Y. In this capacity, he was responsible for the market development of many new resins and varnishes.

## AMERICAN CYANAMID

**Albert J. Kirsch,** formerly a chemist in the plastics and resins section of the company's Stamford research laboratories, has been appointed technical service representative for coating resins in the plastics and resins division.

Mr. Kirsch has been engaged in technical service and resin development-application activities in the plastics and resins section since he joined the company in 1945. He was primarily concerned with the development and evaluation of "Cycopol" resins and various coating vehicles designed for industrial and architectural applications.

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If you are not already using Neville coumarone-indene or petroleum resins in your paint or varnish formulae, it will pay you to request the assistance of our Technical Service Laboratory. Our chemists will work with yours to establish the exact grade to best suit your purpose. Neville resins are inert, add resistance to acids, alkalis, brine and water and may be cold-blended or cooked with all commonly used drying oils. Use the coupon to write for details.

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PVP-8

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**Here are some of the important advantages these new vehicles offer polymer and alkyd manufacturers.**

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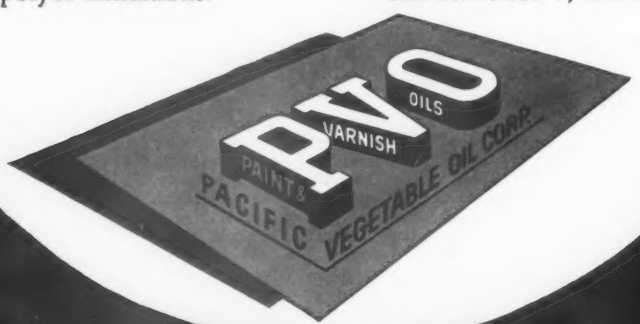

### AMSCO

**Leon Breton** has been appointed manager of market research and development, according to an announcement by E. M. Toby, Jr., president. Working under Mr. Toby, he will be responsible for the direction of market survey activities and consumer research in regard to solvents, petroleum derivatives and petrochemicals. He will also assist in sales work involving these products, coordinating developments with the company's research facilities. Mr. Breton will make his headquarters at Amsco's Chicago office.

L. Breton

Prior to this appointment, he was manager of Amsco's metropolitan division at the company's eastern headquarters.

### PITTSBURGH PLATE GLASS

**Robert Wardrop** has been appointed manager for the Detroit, Mich., distributing branch, it was announced by D. C. Burnham, vice president, merchandising division.

Mr. Wardrop succeeds **A. J. Roche** who has relinquished his responsibilities as manager following 45 years of service with the company. Mr. Roche, who had served almost 17 years as Detroit manager, will continue on a part-time basis in an advisory capacity at Detroit for a few months.

Mr. Wardrop joined Pittsburgh Plate as a student apprentice in 1935, and the following year transferred to the Minneapolis, Minn. distributing branch as a clerk. He also served there as a territorial salesman prior to being named manager for the company's Duluth, Minn. distributing branch in 1939.

In 1946 he was appointed manager of glass advertising and sales promotion with headquarters in Pittsburgh. Three years later he transferred to Detroit where he has since served in an automotive glass sales liaison capacity as assistant to the vice president.

Mr. Roche has been associated with Pittsburgh Plate since 1910 when he joined the Cleveland, Ohio distributing branch as a clerk. Prior to being appointed manager of the Detroit branch in 1939, Mr. Roche had served as manager for the company's Akron and Toledo, Ohio distributing branches.

### AMERICAN POTASH & CHEM.

**Harold Mazza** has been appointed to the newly established position of manager of research at the Los Angeles plant, according to an announcement by Joseph C. Schumacher, vice president in charge of research.

Mr. Mazza previously was assistant director of research at the company's main plant at Trona, Cal. In his new position, he will be in charge of research work on new process development and technical service at the Los Angeles facility.

### SOLVAY PROCESS DIV.

**Wilbur L. Epting, Jr.,** has been named manager of the new chlorine-caustic soda plant at Brunswick, Ga., and **Bruce T. Smith** has been named assistant manager, it was announced by H. R. Margetts, director of operations.

Mr. Epting's career with the company dates back to 1946 when he started as an assistant chemist at the Huntsville, Ala., plant. Two years later he was advanced to general foreman of the plant. He moved to Syracuse in 1952 as general foreman of the company's electrolytic caustic soda plant. He was named supervisor of the Syracuse chlorine installation the following year, and in 1955 became assistant manager of the Moundsville, W. Va. plant.

Mr. Smith was employed in 1946 as shift foreman at the plant in Huntsville. He transferred to Syracuse five years later as a technical assistant and in 1953 was appointed assistant supervisor of the chlorine plant there.

### GIBSON-HOMANS

**Robert Hicks** has been added to the sales organization, it was announced by Harry Hutson, vice president in charge of marketing. Mr. Hicks will cover the New England states.


**Wouldn't You Like Your Paras and Toluidines in 25 lb. Bags?**

OLD WAY OR THIS...

*HERE ARE FOUR GOOD REASONS WHY.*

**This new packaging procedure:**

1. SAVES WEIGHING
2. SAVES STORAGE SPACE
3. REDUCES SPILLAGE
4. LESSENS DUSTING

***and all this, at no additional cost to you***

**REDS NOW PACKAGED IN 25 POUND UNITS**

| PARA REDS | | TOLUIDINE REDS | |
|---|---|---|---|
| No. 1667 | Para, Ex. Light, Toluidine Shade | No. 1077-S | Toluidine, Ex. Ex. Light, Very Best Gloss |
| No. 1000 | Para, Light | No. 1077 | Toluidine, Light |
| No. 1650 | Para, Medium | No. 968-F | Toluidine, Non-Haze |
| No. 1670 | Para, Dark | No. 1073 | Toluidine, Medium |
| No. 1605 | Para, Dark | No. 1078 | Toluidine, Dark |
| No. 1606 | Para, Dark, Extra Soft | | |

Kentucky Color
AND CHEMICAL COMPANY, INC.
Louisville 12, Kentucky

1. Please call on us and discuss Kentucky Colors in 25 lb. units _____
2. Please match enclosed envelope sample (or color chip) _____

NAME _____
COMPANY _____
STREET _____
CITY _____ STATE _____

N. Burton

G. Richardson

**GLIDDEN**

**George B. Richardson** has been appointed national manager of industrial maintenance sales for the paint division, and **N. T. R. Burton** has been named trade sales manager of the Mississippi region with headquarters in St. Louis, Mo., it was announced by A. D. Duncan, Glidden vice president and general manager of the paint division.

In this new position Mr. Richardson will work with the company's regional directors and industrial sales managers in the development of a national industrial maintenance program. He will also be responsible for sales of new proven quality products for the industrial maintenance field. In this latter responsibility he will work closely with the national maintenance laboratory which was recently established in Cleveland.

Mr. Burton succeeds **George J. Seith** who was recently promoted to the post of regional director of the Mississippi region.

In his new position, Mr. Burton will direct all paint trade sales activities in an area comprised of Missouri, Arkansas, Oklahoma, Kansas and Colorado together with parts of Mississippi, Tennessee, Kentucky, Indiana, Illinois and Wyoming. He will have responsibility for dealer and maintenance sales as well as supervision of the company's regional branches and trade sales department.

**COLUMBIAN CARBON**

**Milton D. Lange** has joined the carbon black and pigment division and will have charge of the company's new sales office in Monroe, La., serving carbon black and pigment users in the southwest.

M. D. Lange

Mr. Lange comes to Columbian from Armstrong Tire & Rubber Co., having previously been connected with Mellon Institute of Industrial Research and the B. F. Goodrich Co. He is a member of the Akron Rubber Group, American Institute of Chemical Engineers, Kappa Beta Phi Fraternity and Isaak Walton League.

**CARBIDE and CARBON**

**Eight** salesmen have been reassigned as follows:

**L. R. Bingaman** has been assigned to the Philadelphia district; **J. R. Conaway** will now work in the St. Louis district; **J. T. Ferguson** has been transferred to the New York district; **M. M. Maupin** has been transferred to the Houston district; **A. Pros** has been assigned to the New York district; **R. A. Schongar** will now work in the Newark district; **D. P. Shannon** has been assigned to the Chicago district, and **R. S. Trebus** has been transferred to the Kansas City district.

**NORTHWEST NITRO-CHEMICALS**

**Thomas B. Potter,** assistant to the vice president, petrochemicals division, Commercial Solvents Corp., has been named secretary and assistant treasurer of Northwest Nirto-Chemicals, Ltd., a Canadian affiliate of CSC, it was announced by Howard L. Sanders, Commercial Solvents' vice president, who is also the treasurer of Northwest Nitro.

Mr. Potter will headquarter at Northwest Nitro's new $22 million plant, which is now under construction at Medicine Hat, Alberta, Canada. When completed this fall, the new plant will produce nitrogen-bearing fertilizers for distribution in the prairie provinces of Canada and the northwestern United States.

Mr. Potter has been associated with CSC since 1925. In his most recent position, he was concerned with the management and coordination of production, market development and sales for the broad range of industrial, agricultural, and automotive petrochemicals made by the company.


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**METHYL GLUCOSIDE—THE CYCLIC POLYOL**

FOUR reactive hydroxyls and low cost are Methyl Glucoside's biggest drawing cards.

The cyclic polyol MG can be esterified by:

- direct esterification
- transesterification
- reaction with acyl halides, acyl anhydrides

Tall oil and drying oil fatty acid esters of MG make excellent coating vehicles.

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MG is used for alcoholysis of triglycerides in the manufacture of specialty alkyds. Oil-modified tetrahydrophthalic, adipic or sebacic MG alkyds are new and different. . . . And these are just a few of the many esterifications possible with MG.

Summed up, the versatility of the four hydroxyls of MG offer a wide range of chemical possibilities. Let MG go to work for you . . . improve performance, lower cost, broaden your markets . . . Contact us today. We'll supply you with samples, information and technical know-how.

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**RESINS**
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**SURFACTANTS**
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**TALL OIL ESTERS**
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**DRYING OILS**
•
**PLASTICIZERS**

ARGO®

Chemical Division

**CORN PRODUCTS REFINING COMPANY**

17 Battery Place, New York 4, N. Y.

# NEWS

## Announce Fall Dates For DeVilbiss Spray School

Dates for the fall courses of instruction for contract spray painters and their representatives at the DeVilbiss Company School of Spray Finishing at Toledo, Ohio, have been announced as follows: Oct. 29, Nov. 26, and Dec. 17. Applications are now being accepted.

Classes of limited size are enrolled at no cost for tuition, the accepted students paying only for their transportation and room and meals. All users of DeVilbiss equipment are eligible to send their representatives or operators. Classes run from Monday through Friday from 8 a.m. to 5 p.m. Application blanks may be obtained by writing the DeVilbiss Co., 300 Phillips Ave., Toledo 1, Ohio.

The school now completing its third decade of operation, has recently been expanded in size and facilities and an additional instructor, Anthony Stranges, has been appointed to the staff. The classroom area and film projection room are air conditioned and the shop practice laboratory is equipped with installations of the latest innovations for spray application. Classes also have available the complete facilities of the DeVilbiss laboratory for customer research.

## New ASTM Officers

The American Society for Testing Materials has elected the following officers:

President—Rudolph A. Schatzel, vice president and director of engineering, Rome Cable Corp.; Vice President—Kenneth B. Woods, head, School of Engineering and director, Joint Highway Research Project, Lafayette, Ind.; Directors—Miles N. Clair, president, The Thompson & Lichtner Co.; Howard C. Cross, assistant technical coordination director, Battelle Memorial Institute; George H. Harnden, consultant, materials and processes, engineering standards service, General Electric Co.; R. R. Litehiser, engineer of tests, Ohio State Testing Laboratory, and Charles R. Stock, senior group leader, physical measurements laboratories, American Cyanamid Co.

## McDanel Expanding

The McDanel Refractory Porcelain Co., Beaver Falls, Pa., one of the nation's leading manufacturers of industrial ceramics, has announced the near-completion of a $125,000 expansion program.

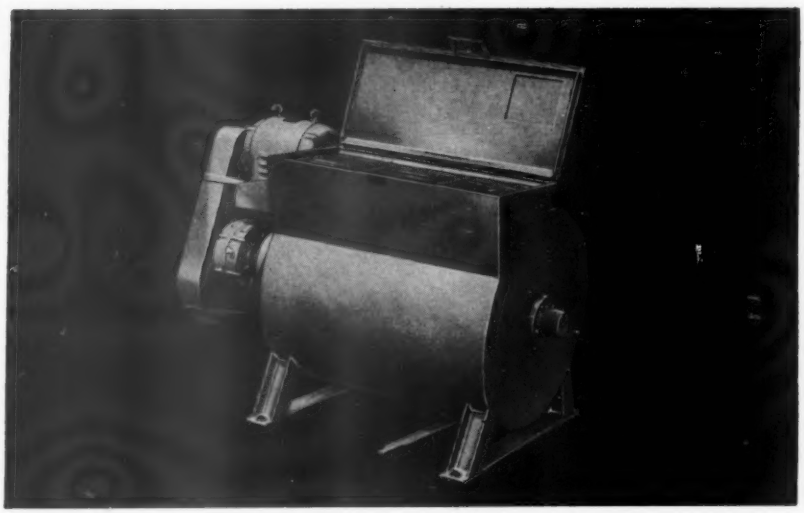
In addition to a number of new manufacturing and production facilities, 2,500 square feet of floor space have been added to the production area of the plant. Office and executive areas have been increased by over 400 ft.

## Continental, Gair Merger

General Lucius D. Clay, chairman of the board of Continental Can Co., and George E. Dyke, chairman of the board of Robert Gair Co., Inc., have announced that a merger of the two enterprises has been approved by the directors of Continental and the executive committee of Robert Gair, both of whom will recommend it to their stockholders.

## Ziegler Expands Gilsonite

G. S. Ziegler and Co., New York City, has announced an increase in production due to expanded demand for Gilsonite in the underground pipe insulation field.

**Why this Hockmeyer Horizontal Paste Mixer brings you**

**3 IMPORTANT ADVANTAGES**

**1. Faster mixing**
**2. Greater efficiency**
**3. Easier cleaning**

The Hockmeyer Horizontal Paste Mixer's 3 sets of mixing blades are specially designed, precision built. They eliminate "dead spots" and material build-up on tank sides. Their double rolling action agitates the batch into a homogenous mass in the shortest possible time. The unit is excellent for lead pastes, wood fillers, caulking compounds, color dispersions and other heavy, non-flowing materials. Its greater mixing efficiency provides a bonus in the form of lower horsepower requirements.

One of the Hockmeyer Horizontal Paste Mixer's most important advantages is that it is self-unloading. Its unusual mixing action pushes out even viscous, non-flowing materials; the bottom center gate outlet controls the rate of flow.

Cleaning this mixer is easy. Just place a solvent in the machine and start the motor.

The Hockmeyer Horizontal Paste Mixer is *safe* to use, too. All external moving parts are covered with a steel guard. A removable steel grating over the top opening prevents anything falling in and being caught in the blades.

The Hockmeyer Horizontal Paste Mixer is a valuable unit on both continuous and changing batch operations. Write today for free technical data sheet.

3 sets of blades touch every area of tank during mixing action!

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**Herman Hockmeyer and Company** PVP-86
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My name_____

Company_____

Address_____

City_____ Zone____ State____

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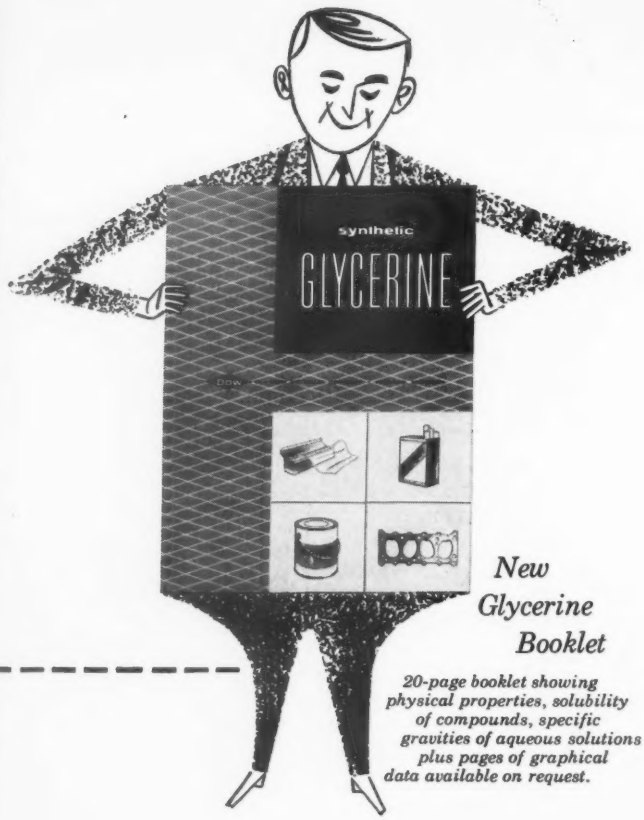
## ORDER FROM LOCAL STOCKS!

## Dow's new synthetic now on stream




*New Glycerine Booklet*

*20-page booklet showing physical properties, solubility of compounds, specific gravities of aqueous solutions plus pages of graphical data available on request.*

### physical properties of Dow's synthetic glycerine

| | |
|---|---|
| Molecular Weight | 92.09 |
| Specific Gravity at 25/25°C | 1.262 |
| Pounds Per Gallon at 25°C | 10.50 |
| Boiling Point at 760 mm. Hg., °C | 290.0 |
| Melting Point, °C | 17.9 |
| Viscosity at 25°C., Centipoises | 945 |
| Specific Heat at 25°C., Cal./g/°C | 0.577 |
| Flash Point, °F | 350 |
| Fire Point, °F | 400 |
| Auto Ignition Point, °F, (on glass) | 804 |
| Refractive Index at 25°F | 1.4722 |

Need glycerine? Stocks are as close as your phone. Dow's pure synthetic offers outstanding properties for producers of alkyd resins, chemical formulations, cosmetics, paper products and tobacco.

Local stocks of glycerine, and many other quality solvents and chemicals are available from your nearby Solvents and Chemicals bulk plant. For samples and prices, call or write.

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Toledo 8, Ohio

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2540 West Flournoy Street • Chicago 12, Illinois

# PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

### Organotin Derivatives Of Glyceryl Mono-Esters

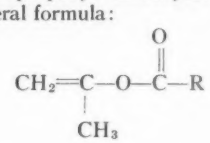
*U. S. Patent 2,744,876. Hugh E. Ramsden, Metuchen, N.. J., assignor to Metal & Thermit Corporation, New York, N. Y., a corporation of New Jersey.*

As a stabilizer for a resin, a novel organotin derivative of a glyceryl monoester, selected from the class consisting of alkyltin, aryltin and aralkyltin derivatives of monoesters of saturated, ethylenic unsaturated and hydroxyl substituted aliphatic hydrocarbon monobasic acids wherein alkyl, aryl and aralkyl groups are attached to monoester through tin and tin is connected to the mono-ester through oxygen.

### Highly Unsaturated Polymers

*U. S. Patent 2,751,372. Erle W. Taylor and Cornelius C. Unruh, Rochester, N. Y., assignors to Eastman Kodak Company, Rochester, N. Y., a corporation of New Jersey.*

A process for preparing a resinous polymer having a high degree of unsaturation which comprises heating a resinous polymer selected from the group consisting of (1) a homopolymer of an isopropenyl carboxylate having the general formula:

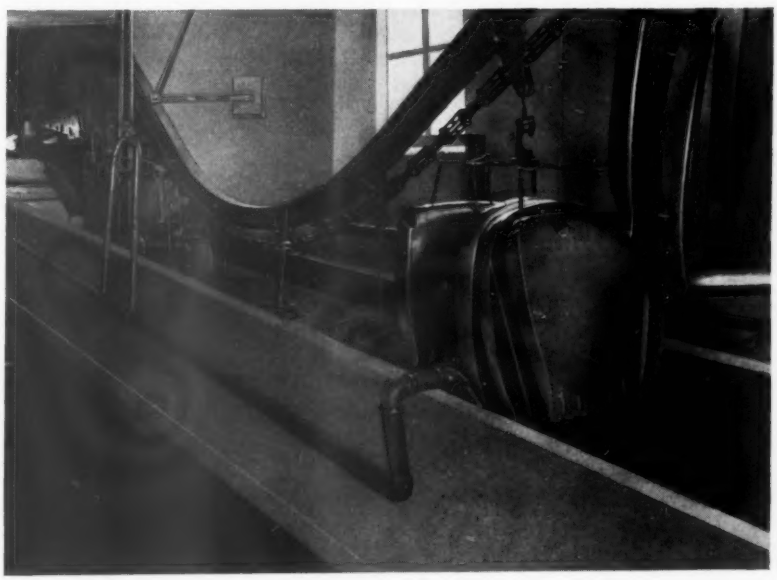


wherein R represents a number selected from the group consisting of an alkyl group containing from 1 to 3 carbon atoms and phenyl, and (2) an approximately 1:1 copolymer of the said isopropenyl carboxylate and a monomer selected from the group consisting of a dialkyl fumarate wherein each alkyl group contains from 1 to 4 carbon atoms and a dialkyl maleate wherein each alkyl group contains from 1 to 4 carbon atoms, at a temperature of from 190° to 250° C., substantially in the absence of oxygen, until substantially all of the available carboxylic acid in the said isopropenyl carboxylate of the said polymer has been split off to give said resinous polymer having a high degree of unsaturation.

### Hydration Method Of Refining Glyceride Oils

*U. S. Patent 2,752,378. Percy L. Julian, Oak Park, and Herbert T. Iveson, Elmhurst, Ill., assignors to The Glidden Company, Cleveland, Ohio, a corporation of Ohio.*

In the process of refining animal and vegetable oils which contain sterols, the improvement which comprises: providing a mass of said glyceride oil containing natural free fatty acids in an amount between about 0.15% and 1%, and having a gum content below about 0.5% bringing said oil to a temperature between about 50° and 70° F. and while maintaining the oil within said range of temperature emulsifying it with a small quantity of an aqueous solution which: (*a*) has a specific gravity between about 12° Be. and 20° Be.; (*b*) contains at least one alkali metal alkali dissolved therein in an amount at least sufficient to neutralize the free fatty acid content of the oil; and (*c*) which contains dissolved therein an emulsion breaking amount of at least one emulsion breaking agent from the group consisting of alkali metal borates, pyrophosphates, silicates, acetates, and oxalates, and alkali metal salts of ethylene diamine tetra-acetic acid; maintaining said emulsion at temperatures between about 50° F. and 70° F. for a time period between about 3 and 20 minutes, while subjecting it to vigorous agitation; at the end of said time period promptly passing the emulsion to a centrifuge wherein the emulsion is broken as a result of the presence of said emulsion breaking amount of emulsion breaking agent and is separated into a substantially neutral

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refined oil as the light effluent, and a heavier "foots" fraction characterized by having a higher concentration of sterols therein than is present in a comparable "foots" fraction secured when the said provided mass of oil is similarly treated, but without any emulsion-breaking agent.

### Melamine-Formaldehyde Resins

*U. S. Patent 2,750,355. Howard Patrick Ledden, Old Greenwich, Conn., assignor to American Cyanamid Company, New York, N. Y., a corporation of Maine.*

A process for preparing a fast curing thermosetting resin composition, capable of producing clear molded articles, comprising reacting melamine and formaldehyde in a mol ratio of 1:1.5 to 1:2.5, respectively, to form a condensation product, dehydrating the reaction product by heating under a vacuum of at least 52 centimeters until the resin temperature is between about 75-95° C. thereafter adding a mixture of an acid having a dissociation constant greater than $1.0 \times 10_5$ and a compound selected from the group consisting of alkyl alkylol tertiary amines and substituted alkyl alkylol tertiary amines wherein the substituted substituent is selected from the group consisting of chloro, bromo and nitro radicals having a molecular weight less than 140 and drying the mixture to molding plasticity wherein at least the final part of said drying is accomplished in a comminuted state, wherein the weight ratio of said resin to said acid-amine mixture is 1:0.001 to 1:0.05, respectively, and wherein the weight ratio of said acid to said amine is 1:0.5 to 1:20, respectively.

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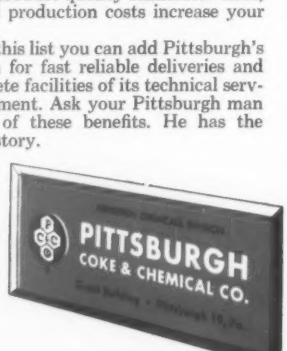
| Fumaric Acid | Alpha Picoline |
| Phenol | Beta Gamma Picoline |
| Ortho Cresol | Sulphuric Acid |
| Meta Para Cresol | Ammonium Sulphate |

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### Stable Condensates Of Urea and Formaldehyde

*U. S. Patent 2,750,356. Melvin D. Hurwitz, Huntingdon Valley, Pa., assignor to Rohm & Haas Company, Philadelphia, Pa., a corporation of Delaware.*

A process for preparing water-soluble, stable urea-formaldehyde condensates which comprises reacting urea and formaldehyde together in a mole ratio between 1:2.5 and 1:3 at a temperature between 60° and 80° C. and at a pH between 7.5 and about 9 in an aqueous solution containing less than about 30% of water, continuing the reaction in the presence of about 5% to 30% of water until at least 85% of the formaldehyde appears chemically bound, as determined by titration of alkalinity of a cold sodium sulfite solution of a sample of the reaction mixture, adjusting the pH of the reaction mixture to a value from 3.8 to 3, and with methanol present in a mole ratio to the urea taken of 2.5:1 to 4:1 heating the acidic reaction mixture under reflux for 5 to 60 minutes.

### Preparation of Chromic Compounds

*U. S. Patent 2,749,214. Arnold J. Eickhoff, Ridgewood, N. J., and Leonard M. Kebrich, Brooklyn, N. Y., assignor to National Lead Company, New York, N. Y., a corporation of New Jersey.*

A process for the manufacture of insoluble chromic compounds which comprises adding an aqueous solution of alkali sulfites and alkali bisulfites to a mixture containing an alkali bichromate an an acid selected from the group consisting of phosphoric, phosphorous and arsenic acids, while maintaining the hydrogen ion concentration of the reaction mixture between a pH of about 1.0 and 4.5.

### Dry Paint Mixture

*U. S. Patent 2,749,249. Nick G. Cadegans, Beloit, Wis.*

In a method of making a dry paint composition from clay, comprising, first subjecting a loose clay to a temperature of substantially 500° F. for substantially three quarter hour, next washing and mixing the clay with water until a liquid batter is formed, next, draining the batter into a vertically elongated settling tank, next, allowing the batter to rest and cream to rise on the surface, next, draining the cream into a vertically elongated cream tank, next, allowing the cream in the cream tank to rest and the coarser material to settle, next, draining the cream into a cream pan, next, subjecting the cream in the pan to a temperature below the boiling point of water until dehydrated, next, grinding the dehydrated cream and forcing it through a screen of substantially 220 mesh.

### Polymerization of Acrylonitrile

*U. S. Patent 2,751,374. Arthur Crosswell, Stamford, Conn., assignor to American Cyanamid Company, New York, N. Y., a corporation of Maine.*

A process which comprises the addition polymerization of polymerizable matter containing a major proportion of acrylonitrile in the presence of an oxidation-reduction catalyst system comprising chloric acid and an acid of the group consisting of sulfurous acid and hydrosulfurous acid.

### Coated Film

*U. S. Patent 2,751,316. Herman G. Phillips, Jr., Wilmington, Del., assignor to Hercules Powder Company, Wilmington, Del., a corporation of Delaware.*

A coated film comprising in combination a substrate of the group consisting of polyethylene terephthalate and polyvinylidene chloride and as a coating therefore a composition containing, as essential ingredients, nitrocellulose and a resinous plasticizing hydroabietyl derivative of the group consisting of hydroabietyl alcohol, dihydroabietyl phthalate and mixtures thereof in the ratio of 35 to 75% by weight of nitrocellulose to 65 to 25% by weight of said hydroabietyl derivative, the sum of the aforestated percentages being substantially 100%, said nitrocellulose and hydroabietyl derivative constituting at least about 85% by weight of the unpigmented ingredients of said composition.

### Solubilized Polyacrylates

*U. S. Patent 2,751,368. John F. Yost, Noroton Heights, and Ilse B. Frederick, Glenbrook, Conn., assignors to American Cyanamid Company, New York, N. Y., a corporation of Maine.*

A composition of matter which comprises a polyoxyalkylene 200-4000 ester of a fatty acyl substance containing from 8 to 22 carbon atoms per acyl chain, and a reaction product having a molecular weight between about 88,000 and about 265,000 of a monovalent base having a dissociation constant on smaller than $1.8 \times 10_5$ with a polymer of a compound of the group consisting of acrylic acid, acrylonitrile, acrylamide and lower alkyl acrylates.

### Asphaltene And Drying Oil Compositions

*U. S. Patent 2,752,264. Marion W. Pickell, Oklahoma City, Okla., assignor to Kerr-McGee Oil Industries, Inc., a corporation of Delaware.*

A protective and decorating coating composition comprising a fatty drying oil and a bituminous material which exhibits substantial freedom from solvent gelling, the bituminous material consisting of asphaltenes having a needle penetration hardness at 77° F. of substantially zero.

### Cement Paint

*U. S. Patent 2,751,308. Artil Arrighini, Southfield Township, Oakland, County Mich., assignor to Rocwall Company, Detroit, Mich., a corporation of Michigan.*

A compostion for producing a cement paint by the addition of water, consisting of:

| | Pounds |
|---|---|
| White cement | 150–225 |
| Lime | 75–225 |
| Sand (very fine) | 25–75 |
| Sand (40-60 mesh) | 75–125 |
| Asbestos (short fiber) | 5–25 |

### Blown Oil Varnish

*U. S. Patent 2,750,298. Myron W. Kiebler, Jr., Cleveland, and Everett B. Euchner, Avon Lake, Ohio, assignors to The Glidden Company, Cleveland, Ohio, a corporation of Ohio.*

The process for preparing varnish which comprises: providing a component of blown oil selected from the class consisting of blown drying oils, blown semi-drying oils and mixtures thereof, the oil in said component having had oxygen added thereto by blowing at 180-250° F. in an amount substantially equivalent to that produced by blowing tung oil at the same temperatures to a viscosity of M on the Gardner-Holdt scale; preparing a substantially homogeneous liquid-phase mixture containing said blown oil component and resinous material which is soluble therein; treating said liquid-phase mixture at temperatures between room temperature and the decomposition temperature of any of the blown oil contained therein with a small effective amount to about 5% by weight on the resin of catalyst


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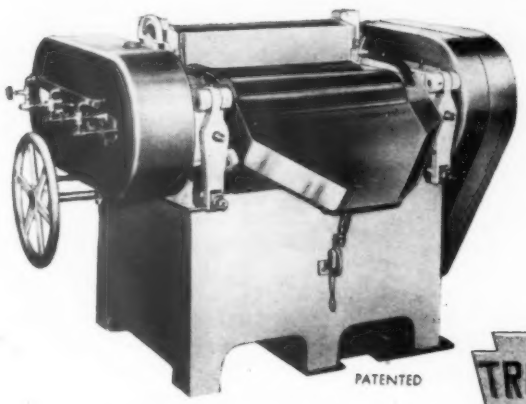


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| XX-503 | ROUNDS | LARGE | 11 | LOW |
| XX-505 | SPICULES MULTI-FACETS | MEDIUM LARGE | 18 | MEDIUM LOW |
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selected from the group consisting of the Friedel-Crafts catalysts, fluoboric acid and mixtures thereof, until the viscosity of said mixture has been increased as a result of the presence and activity of said catalyst; the quantity of resinous material in said mixture being sufficient to impart varnish characteristics to the treated product.

**Pigmented Compositions**

*U. S. Patent 2751,369. Theodore A. Te Grotenhuis, Olmsted Falls, Ohio, assignor of twenty per cent to The General Tire and Rubber Company, Akron, Ohio, a corporation of Ohio.*

A method of making a solid polymeric material containing a pigment therein which comprises forming a mixture of water-immiscible polymerizable liquid containing as a main polymerizable constituent thereof at least one member of the group consisting of the polymerizable conjugated dienes, isoprene, butadiene, dimethyl butadiene and the polymerizable mono-olefinic compounds styrene, nuclearly chlorinated styrene having 1 to 3 chlorine atoms, nuclearly fluorinated styrenes of 1 to 3 fluorine atoms, alkyl arylvinyl compounds, methyl methacrylate and acrylonitrile and a pigment that has an olefinic group attached to at least a portion of the surface thereof through silicon atoms and subjecting said polymerizable olefinic compound of said mixture to a polymerization catalyst and to agitation to cause polymerization while it is distributed as droplets in a continuous phase of water whereby said pigment is retained in particles of the polymeric material produced by polymerization of said oleqnic compound, said pigment being one that has been contacted with an organosilicon compound having one to three water hydrolyzable groups and at least one unsaturated aliphatic group attached directly to the silicon atom.


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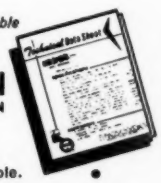

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# NEWS

## Time-Saving Colorants Developed for Painters

Highly concentrated universal tube colorants with rapid dispersion properties for large quantity mixing in oil, alkyd, PVA and latex emulsion paint bases have been developed by the Pittsburgh Plate Glass Co., it was announced recently by Guy Berghoff, general paint manager of the company.

The concentrated hues, developed by the company's Milwaukee technical staff, are said to offer to the painting contractor the first speedy method of providing either on-the-job or shop mixing of a limitless range of custom colors. Minimum amounts of colorant are required to mix five-gallon lots with mixing time, even for dark colors, reduced to less than five minutes.

The tinting system, to be known as Pittsburgh Maestro Concentrated Colorants, consists of nine heavily concentrated colors plus black and white. These will be packaged in eight-ounce and sixteen-ounce tubes. Formulas for mixing the 300 decorator colors in the company's Maestro Colors are provided. In addition, the system offers an unlimited range of custom colors to painting contractors. According to Mr. Berghoff, the new tube colorants will be available this summer from Pittsburgh branches and dealers.

•

## New Packaging Machinery

A total of 126 new pieces of packaging machinery will be exhibited for the first time at The Packaging Machinery & Materials Exposition of 1956 to be held in Cleveland, Sept. 11-14, according to a survey of exhibitors.

A total of 250 pieces of equipment will be exhibited the survey revealed. The show, devoted exclusively to packaging machinery and materials, will emphasize new developments and demonstrations by technicians.

## DeVilbiss Scholarship Plan

Howard P. DeVilbiss, president of The DeVilbiss Co., and Dr. Asa S. Knowles, president of the University of Toledo, have announced that The DeVilbiss Co. has established eight scholarships there in the fields of chemical electrical or mechanical engineering and engineering physics.

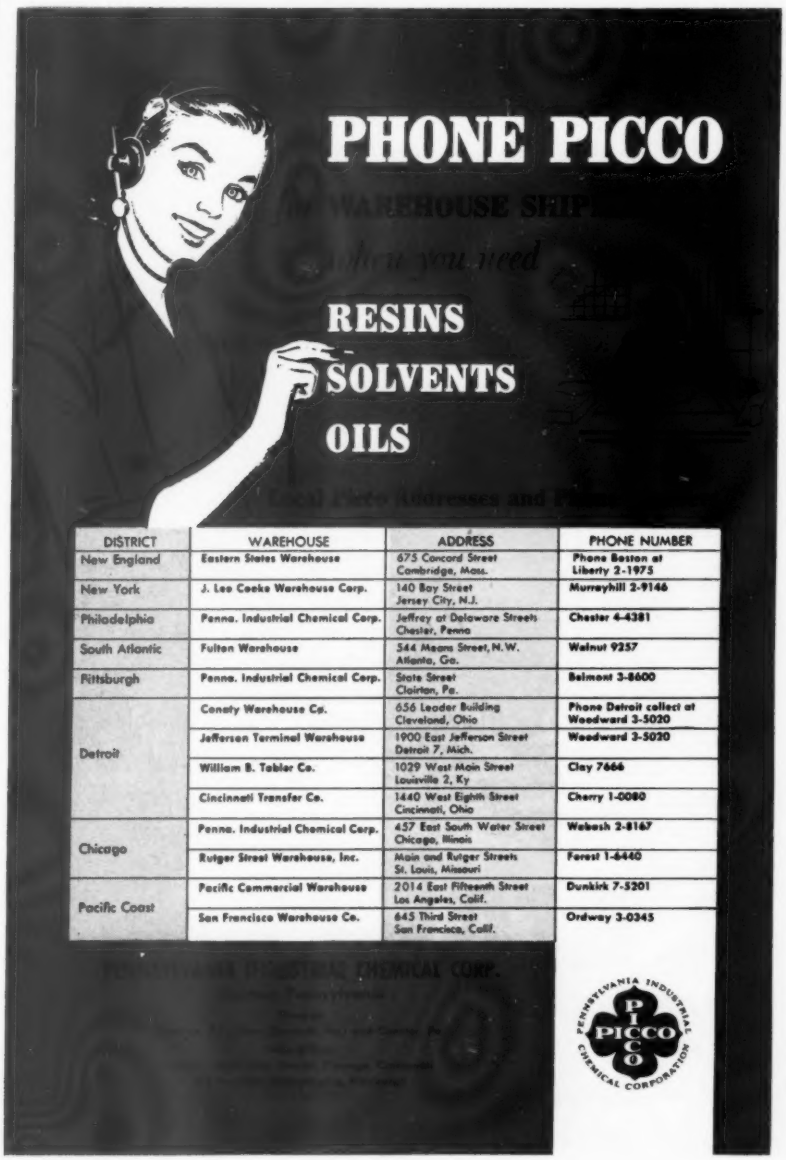
These scholarships are open to high school graduates in the seventeen northwestern Ohio counties and three southeastern Michigan counties nearest to the University of Toledo and also to sons of DeVilbiss employees. The first scholarship winners under this program are David Fletcher of Wakeman, Ohio, and Francis X. Asbeck of Toledo, Ohio.

•

## National Lead Acquires

National Lead Co. has acquired a substantial interest in Baritina de Venezuela, S. A., a distributor of oil well drilling materials in that country since 1949.

The Venezuelan firm will construct production facilities for materials used in drilling fluids by the expanding Venezuelan petroleum industry. These facilities will be the first of their kind in Venezuela, all previous drilling materials having been imported from other countries.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## CALENDAR OF EVENTS

**Sept. 16-21.** American Chemical Society Meeting, Atlantic City, N. J.

**Sept. 24-26.** American Oil Chemists' Society Fall Meeting, Sherman Hotel, Chicago, Ill.

**Oct. 22-24.** 34th Annual Meeting of Federation of Paint and Varnish Production Clubs and 21st Paint Industries' Show, Netherland-Plaza Hotel, Cincinnati, Ohio.

**Nov. 12-14.** 68th Convention of National Paint, Varnish and Lacquer Assoc., Statler Hotel, Los Angeles, Calif.

**Production Club Meetings**

**Baltimore,** 2nd Friday, Park Plaza Hotel.

**Chicago,** 1st Monday, Furniture Mart.

**C.D.I.C.,** 2nd Monday.

Cincinnati — Oct., Dec., Mar., May, Hotel Alms.

Dayton — Nov., Feb., April, Suttmilers.

Indianapolis — Sept., Claypoll Hotel.

Columbus — Jan., June, Fort Hayes Hotel.

**Cleveland,** 3rd Friday, Harvey Restaurant.

**Dallas,** 1st Thursday after 2nd Monday, Melrose Hotel.

**Detroit,** 4th Tuesday, Rachham Building.

**Golden Gate,** 3rd Monday, E. Jardin Restaurant, San Francisco.

**Houston,** 2nd Tuesday, Bill Williams Restaurant.

**Kansas City,** 2nd Thursday, Pickwick Hotel.

**Los Angeles,** 2nd Wednesday, Scully's Cafe.

**Louisville,** 3rd Wednesday, Seelbach Hotel.

**New England,** 3rd Thursday, University Club, Boston.

**New York,** 1st Thursday, Brass Rail, 100 Park Ave.

**Northwestern,** 1st Friday, St. Paul Town and Country Club.

**Pacific Northwest,** Annual Meetings Only.

**Philadelphia,** 3rd Wednesday, Philadelphia Rifle Club.

**Pittsburgh,** 1st Monday, Gateway Plaza, Bldg. 2.

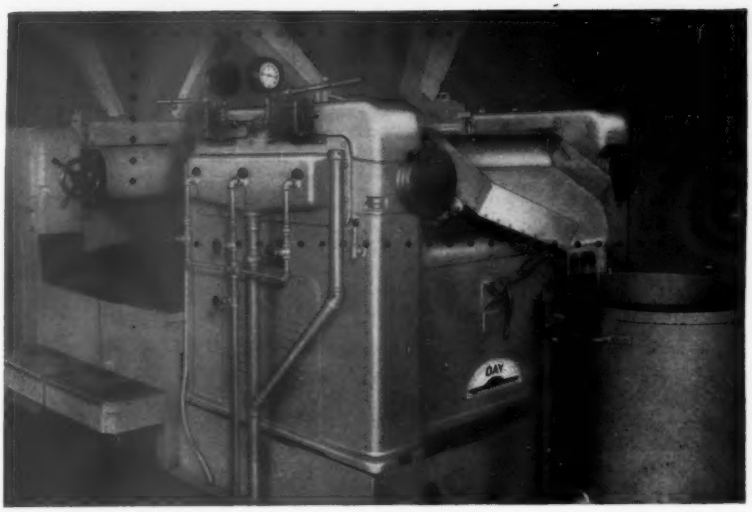
**Rocky Mountain,** 2nd Wednesday.

**St. Louis,** 3rd Tuesday, Kings-Way Hotel.

**Southern,** Annual Meetings Only.

**Toronto,** 3rd Monday, Oak Room, Union Station.

**Western New York,** 1st Monday 40-8 Club, Buffalo.

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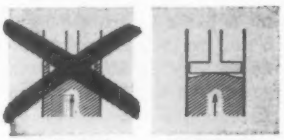

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# abstracts

### Finishes Resistant To Handling and Manipulation

*La Chimie des Peintures, October 1954, pp. 307-312.*

Combinations of polishing waxes are considered, with addition products, which are utilized to improve the handling resistance of the lacquered surfaces. It is a question of combinations of waxes with such addition products which exercise a "quasi" plasticizing action on the lacquer coating.

This was German development work, conducted by Borkart and Graak; further research development work which was conducted in Belgium on this subject and developed to a successful conclusion was not only concerned with developing and enlarging the principles outlined by Borkart and Graak, but had the objective also of extending this principle of the development of organic finishes resistant to handling, over a far wider industrial field and to base this finish development work on more fundamental and profound principles.

The two German workers started their development work with the principle of the necessity of applying on the finish lacquer coating, a protective coating of wax. They are in agreement on the necessity of inducing this wax coating to penetrate into the lacquer finish film in order to "plasticize" this latter. This term "plasticize" is a somewhat inexact expression of a badly defined process. Regarding the actual penetration which is achieved in this way under the effect of the polishing process, into the lacquer film, this is somewhat doubtful.

The Belgian work, which carries this development a stage further, is based on the conception of incorporating the polishable material in the lacquer formulation itself, with a one stage application.

The added material is termed not a plasticizer but a "supple-rendering" addition material. For this purpose, the use of employing directly both natural and synthetic waxes was abandoned; it was found that certain synthetic products of an amorphous to microcrystalline character, of waxy texture, and physical and chemical constants that harmonize with those of the constitutive resins of the lacquer concerned, give better results. Contrary to the classical lacquer-polishing procedure of super-imposed films and where the wax is pressed into the surface of the lacquer finish with this new procedure, one has a finish film which is perfectly homogeneous, very hard but sufficiently supple to permit a polishing (mechanical or by hand without having recourse to any physico-chemical influences on the finish film, i.e. by the influence of solvents.

The synthetic products used to achieve this effect can be added in a reactive form in such a proportion that the other constituents of the lacquer finish —resins and/or oils are only partially involved in the reaction induced. Or the reaction can be conducted up to the point where it involves integrally all the reactive molecules and in this case one will obviously obtain finish film which is more supple although of a sufficient hardness.

With the filming process conducted according to the first method, the net result is that the resins form a particularly hard coating after drying and constituting the basis of the film and the waxy materials incorporated, permit the polishing of the hardened

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finish coating without being dislodged from the film and without the necessity of being solvented before the polishing. These two processes above, can be merged from one to another, so that one can obtain a finish film which has any desired characteristics of hardness, suppleness and polishability to conform to any specific purpose and application.

Finishes formulated in this manner can be applied by any of the usual means, including French polishing processes. After the finish has dried out and hardened, a light polishing produced by the usual means will produce the desired effect, i.e. a durable brilliancy of such a depth which has a natural tendency to increase with the progressive aging of the film. In the case of finishes of this nature applied to wood surfaces, the luster of the finish can be maintained by simple rubbing with a lambs wool cloth without applying any polish and this can be repeated practically right up to the total usage of the finish film.

**Allyl Melamin Ether and its Use In Air-Drying Alkyd Resin Lacquers**

*By H. Zumstein: Farbe und Lack, vol. 60, No. 12, p. 537 (December 1954).*

A report was recently given to the Swiss Society of Lacquer and Paint Chemists regarding a new melamine resin for lacquers, developed by the CIBA Aktiengesellschaft at Basle, which possesses air-drying characteristics.

As is well known, the melamine and urea lacquer resins now in use are used almost exclusively in combination with alkyd resins, by which finish coatings of great hardness and outstanding film brilliancy are obtained. Such coatings must, however, be stoved or they are hardened-off in the cold by acid catalysts. Through this however, the applicability of such alkydmelamine combinations is limited practically to the clear lacquering of wood.

With this development, it has now become possible to promote and introduce air-drying characteristics into the melamine basic bodies and this is accomplished by etherizing the methylolgroups of the hexamethylolmelamine which is formed by the condensation of melamine with formaldehyde, with allyl alcohol instead of with butanol. With a degree of etherization of at least five allyl groups per melamine molecule, from such a film-forming vehicle coatings can be produced which, after the addition of metal driers, (in all cases after addition in the presence of peroxides), dry rapidly in the air to give a very hard film.

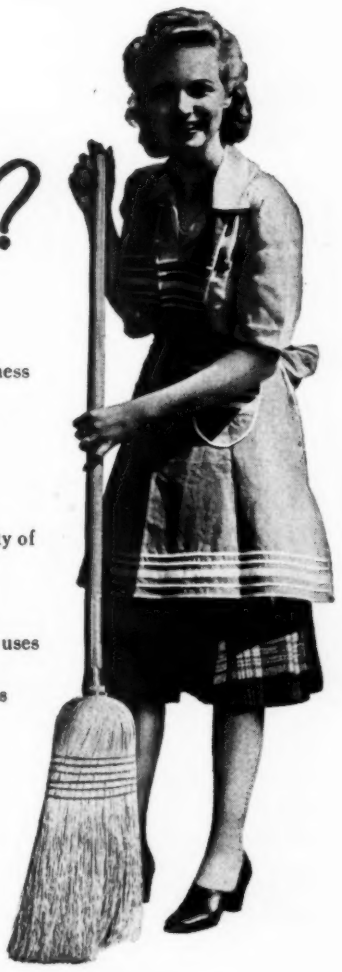
A disadvantage to the use of the new allyl-melamine ether resins as an autobonding medium is the low elongation characteristics of the coatings. By subsequent, partial esterization of this new melamine resin with drying fatty acids, it has been possible to achieve the compatibility of the resin with oil-based vehicles, such as drying alkyds which permit the production of high grade alkyd-melamine combinations.

Such air-drying finish systems correspond in their lacquer-technico characteristics to the best stoving finish combinations which have given proven service for many years, on the alkyd-melamine basis, i.e., they are characterized by very high hardness, outstanding brilliancy, suppression of yellowing tendencies and better spread and flow properties. Naturally here also, the choice of the alkyd resin plays a determing role, but nevertheless, the additions of allyl-melaminether resin are held between 10 and 30%. An improvement of the chemical-resistance stability of such coatings is not to be expected, because of the numerically strong domination of the alkyd component.

The introduction and employment of these new alkyd-melamine combinations is particularly indicated, where up to now it has not been possible to make use of the outstanding characteristics of such finish systems, because for one reason or another, a stoving of the finish coating could not be entertained, as for example, in wood finishing.

Obviously, these new finish combinations can be also stoved. But if this is done, they offer no advantages as compared with the formerly used alkyd-melamine stoving finish systems, as regards the stoving range.


A Clean Sweep?



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### High Gloss, Polishable Nitrocellulose Lacquers

*By E. Muethlein: Farbe und Lack, vol. 61, No. 2, pp. 67-68 (February 1955).*

To produce high gloss nitrolacquer and nitro-combination lacquers one normally works in practice with varying resin and plasticizer additions.

In this way, satisfactory results from every aspect are not always obtained and this applies particularly when an additional requirement of the film is polishability. The application of high amounts of plasticizer certainly leads to sufficient brilliancy but the surface of the lacquer film then possesses an insufficient degree of hardness; in the inverse direction with too high an addition of resin, one achieves hard finish films, but in this case, few examples of the formulation will be found to be polishable.

Apart from cardinal formulation defects, such as unsuitable solvent medium combination, insufficiently finely milled pigment paste, etc.,' the fundamental cause for unsatisfactory brilliancy of the nitro-lacquer film surface can be ascribed to the quality of the nitrocellulose employed, i.e. its degree of nitration. Insufficiently nitrated lacquer collodion wools show non-nitrated —OH—groups at the periphery of the cellulose molecule; as is known, these groups have a considerably adverse effect on the solubility of the product in organic solvent medii and as a result give clouding, precipitation, dull surface and other undesirable phenomena.

The only effective way to deal with this problem at its root cause is to remove the brilliancy-restricting effect from the —OH—groups which are present in the nitrocellulose structure. This possibility consists in the fact of adding to the lacquer finish such substances which incorporate in their molecule, in addition to a hydrophobic main valency chain, so many hydrophilic groups that in addition to the solubility in the organic solvent mediums which is naturally necessary, they possess to a considerable extent or even completely, a water solubility.

These substances are termed "brilliancy" promoters and are, for example, some of the higher alcohols or esters of these, or natural or synthetic resins esterized with these alcohols, certain emulsifiers of the ethylene oxide type, condensation products, water-soluble polyvinyl compounds, par-ticularly polyvinyl ether and others.

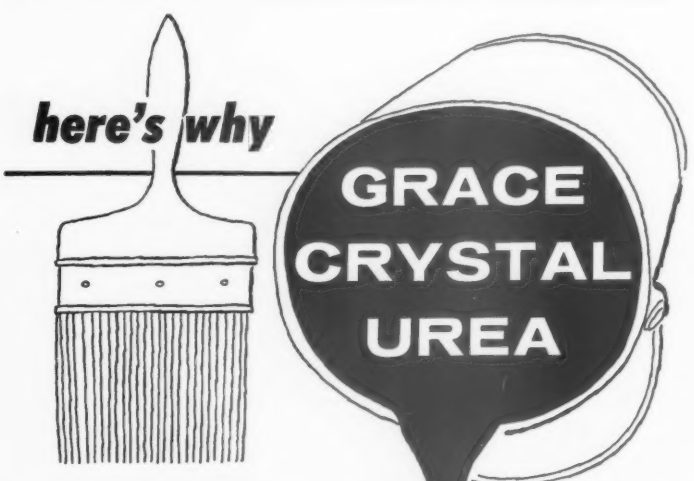
The brilliancy promoting effect of these substances is based on the fact that they so orientate themselves in the lacquer film that their hydrophilic groups are directed to the—OH—groups of the nitrocellulose molecules which are badly nitrated or not at all. Through this orientated absorption the —OH—groups of the nitrocellulose which have a restrictive influence on the brilliancy, are blocked and screened by the hydrophobic main valency chain of the brilliancy promoter. They lose their disturbing effect accordingly and simultaneously the lacquer film attains an increased brilliancy and an increased polishability characteristic by virtue of the hydrophobic chains of the brilliancy promoter which are orientated outwards and directed towards the surface of the finish film.

This arrangement of the brilliancy promoting molecules in the lacquer film ensures in spite of their—at least partly—water solubility, an unreduced and even often improved water resistance of the lacquer. The brilliancy promoter must, in order to render the desired effect clearly visible, have sufficient time in order to allow its action in the lacquer to completely develop. It has been observed that the maximum effect of the brilliancy promoter is only achieved after a storage of the lacquer for days and even weeks.

### Nitrocellulose Lacquers For Aircraft

*A. L. Falkowitz, Naval Air Experimental Station, Philadelphia Naval Base, and F. E. Piech, Experiment Station, Hercules Powder Co., Wilmington, Del.*

A military lacquer coating system which had been used satisfactorily for years on propeller-driven aircraft was found to show sporadic cracking on jet aircraft. Such failures occurred where the coating thickness was heavy in the regions of high stress and because of lower temperatures encountered on jet aircraft in flight.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The Krouse flexure fatigue apparatus was selected because it does simulate aircraft conditions. Lacquer coatings could be evaluated for resistance to stress cracking in a complete system at low temperature (-20°F.). The apparatus and procedure are described. The Krouse machine successfully showed differences in stress cycles before cracking as being due to compositional changes of the lacquer coating.

As a result of this study, an improved formulation was developed and specification MIL-L-006805B (Aer) camouflage lacquer was written.

### Stabilization of Ethylcellulose Against Photo-Oxidation

*J. B. Batdorf, Research Department, Hercules Powder Co., Wilmington, Del., and G. M. Gantz, Antara Chemicals Division, General Aniline and Film Corp., New York, N. Y.*

An absorber of ultraviolet light (2,4-dihydroxybenzophenone) has been shown to be a very effective additive for the stabilization of ethylcellulose toward photo-oxidation. Outdoor exposure tests (13-month duration) of ethylcellulose films have indicated that 1% of the ultraviolet light absorber was more effective in this regard than 5% of an antioxidant (p-tert-amylphenol) or a mixture of the two additives (0.5%—0.5%). Intrinsic viscosity measurements of the exposed specimens were the criterion of stability.

Neither the appearance nor the physical properties of the ethylcellulose formulations was adversely affected by the addition of the ultraviolet light absorber.

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### Ethyl Amyl Ketone, A New High-Boiling Solvent

*R. F. Buller, Shell Chemical Corp., Union, N. J.*

Some of the properties of ethyl amyl ketone (5-methyl-3-heptanone), a newly available, high-boiling solvent (boiling range 157-162° C. ASTM), are discussed with emphasis on those characteristics which indicate its usefulness in coating systems based on nitrocellulose and vinyl resins. It is shown to be a powerful solvent for typical nitrocellulose alkyd and maleic-resin systems and for vinyl resins. Volatility is in a desirable range and blush resistance is of a high order.

High boiling solvents are used to some extent in almost every nitrocellulose lacquer and thinner, the amount varying with the special requirements of the proposed application. Examples are given of how ethyl amyl ketone might be used in the formulation of complete nitrocellulose-base lacquers and thinners. Applications discussed include conventional and high-low automotive refinish thinners, wood lacquers —cold and hot spray types, and floor lacquers intended for brushing application. Selected performance data are given which will assist the formulator in judging the contribution of ethyl amyl ketone to the properties of complete coating systems, with particular emphasis on blush resistance and flow-out qualities. Laboratory instruments are briefly described which enable numerical ratings to be assigned to blush resistance and flow-out qualities.

### Melamine Resins In Automotive Lacquers

*William L. Hensley, Stamford Research Laboratories, American Cyanamid Co., Stamford, Conn.*

Melamine formaldehyde resins may be used to improve weathering of automotive lacquers. Melamine Resin 248-8 is an effective hardener in high-resin nitrocellulose lacquers, permitting higher resin-nitrocellulose ratios, enhancing initial gloss and gloss retention. Florida exposure tests have shown after 6 months and one year, gloss retention

comparable to that of a baked synthetic enamel. Total solids at spray viscosity are increased by 50%. Best gloss retention was obtained when 20% of the total resin was introduced as melamine formaldehyde resin. A nitrocellulose-total resin ratio of 100 to 750 parts was found to be optimum.

*The following are summarizations of papers given at the September 1955 meeting of the Paint and Finish Section (Koeperfarben und Anstrichstoffe) of the Germany Chemical Society.*

### Effect of Aluminum Alcoholates on Linseed Oil Film

*By F. Schlenker.*

In association with the numerous researches undertaken by Prof. Eibner and his school on the processes with oil drying, the author dealt with the oxy-polymerization process which takes place with the film formation of oil-containing finish systems and it was indicated that in spite of the most intensive research work, up to now it has not been possible to clarify clearly the course of the film formation processes.

The author then dealt with the various endeavors which have been made to influence this film formation process and there was discussed in particular the work by Prof. Eigenberger dealing with the strengthening of oxidative drying film formers with aluminum alcoholates and with this, in the case of linseed oil, the course of the reaction which occurs.

From the unsaturated system of the two oxygen-active acid components of the linseed oil, with the filming there are formed easily enolisable oxynes which are characterised by the alpha-oxyoxo group and by the alpha-dienol respectively. Ketolitic oxynes of this type form complex salts with aluminium alcoholate and are defined by the aluminium number. This can be ascertained by titration. It is possible with the aid of the aluminium number, to follow the auto-oxidation process of the natural linseed oil. This was then discussed by the author in a detailed consideration. From this it appears, that after conjugation and formation of the peroxide radical, an equilibrium condition is formed between the conjugated hydroperoxide and the non-conjugated ethylene peroxide by which the latter in the following reaction undergoes a stabilization to the alpha-ketol.

While with normal linseed oil drying the mechanism of the reaction appears to run in favor of the hydroperoxide, it can be assumed that in the presence of aluminium alcoholate, the reaction course is transposed towards the side of the non-conjugated ethylene peroxide and of the alpha-ketol which is formed from this.

As a result of the aluminium incorporation there is given on the one hand a molecular enlargement and on the other hand, in comparison to the normal oil, the oxygen absorption, the change in weight and the splitting of volatile degradation products is reduced. The practical significance of the aluminium treated linseed oil as compared with the normal linseed oil is viewed by the author above all in the improvement as regards the drying and the film surface as well as in the protective effect against mechanical and chemical influences.

With the oil filming, the primary oxidation products can be trapped in the presence of the aluminium alcoholate. Similar general relationships as outlined above, are obtained with a further number of metal compounds which contain the metal in an easily split-off form and accordingly are designated as "metal active" compounds.

Besides the evaluation of this data, for the improvement of the film characteristics of the linseed oil, tests were made to show as to how one could arrive at a decision between the Viewpoint of Treibs of ring peroxide formation and the hydroperoxide theory with the initial oxidation products of the linseed oil. By consideration of the work of Eigenberger on ketol type oxynes and the following of the auto-oxidation processes of natural linseed oil with the aid of the aluminium number mentioned above, after conjugation and formation of the peroxide radical there appears to be formed an equilibrium condition between the conjugated hydroperoxide and the non-conjugated ethylene peroxide by which the latter in the following reaction


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undergoes a stabilization to alpha-ketol.

With the action of driers, one has to differentiate between oxygen super-imposition, molecular enlargement and film degradation. An "ideal" driers substance, in addition to the catalyzing of the oxygen absorption, must also prevent too rapid a degradation of the high molecular film structure. This requirement is capable of fulfilment up to a certain degree by certain metal compounds.

It was stated in the discussion, by Prof. Kern that under some circumstances errors could arise in the determination of the aluminium number. According to his experiences, low molecular hydro-peroxides could be retained in an absorption column, high molecular on the other hand, not. The question was asked as to whether the aluminium treated oils are thin fluid and as to whether the treated oil shows a greater or less yellowing as compared with the non-treated oil. It was stated that the treated oils are thinly fluid; the yellowing was not investigated.

As to whether the treated oils show greater or less after-darkening than the natural oils, it was stated that the aluminium treated oils show less after-darkening.

### Cyclo-Rubbers

*By J. Reese.*

After a survey of the most important cyclo-rubbers which have been developed to the present, the various cyclizing methods were then discussed. The development of a type of cyclized rubber which is particularly usable for lacquer purposes was considered in detail. Corresponding to the production conditions, the cyclized rubbers show considerable differences in comparison with one another which can be particularly emphasised by the iodine number, the molecular weight, the viscosity and the sintering point. They contain only 1/5th to 1/2 of the double linkages of the starting material and these also not in the aliphatic chain but in the ring, as is shown by spectrometric findings.

The conclusions obtained regarding the constitution of the cyclisized rubber and the mechanism of the cyclization were discussed. Besides the cyclization, under the influence of the catalyzers and higher temperatures, depolymerization processes must also take place. The double linkages newly formed by this appear to be particularly capable of reaction. They addition among other things, even phenol, which apart from this, develops a favorable inhibitor action with the cyclizing.

Correspondingly prepared cyclized rubbers are outstandingly suitable for the production of corrosion-protective lacquers. The molecular weight lies at about 5,000. The good hydrocarbon solubility, compatibility with other lacquer raw materials, filling power and heat resistance ensure an easy processing and workability. Combinations with mineral oils have been found satisfactory for the preparation of printing inks. The heat stability is greater than that of rubber. Stoving lacquers can also accordingly be prepared.

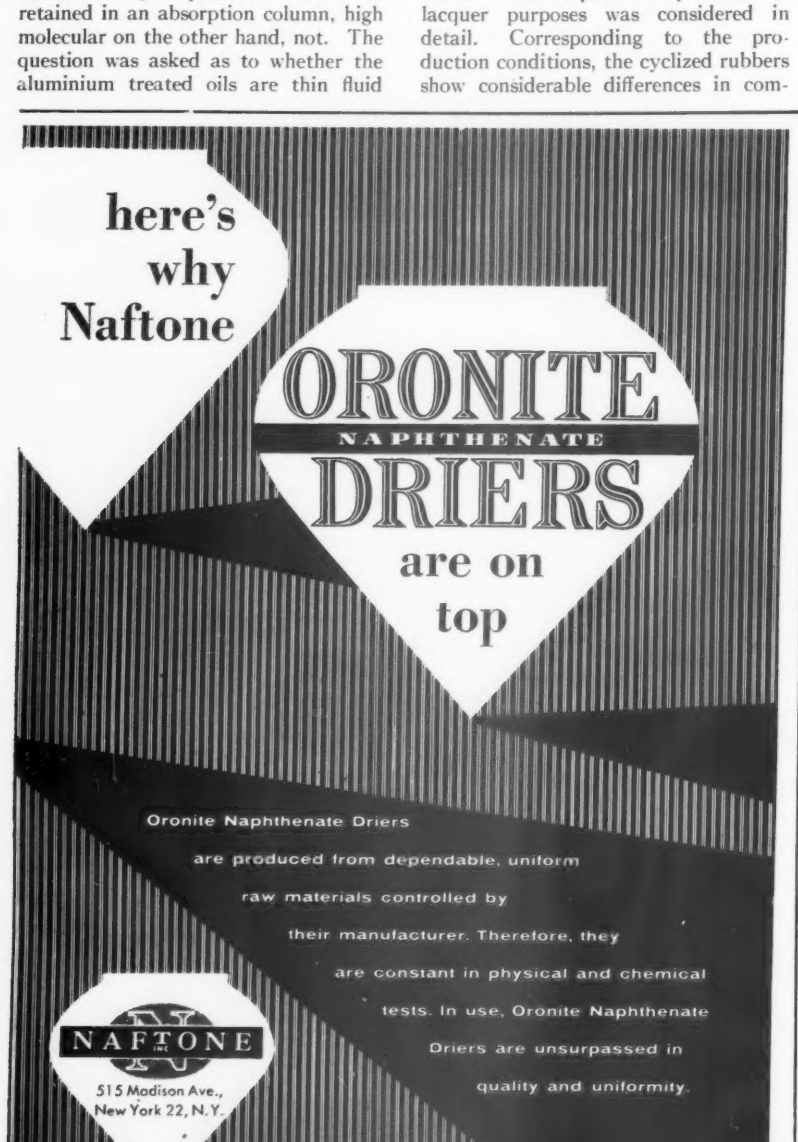
Cyclized rubber films dry not only physically, but also chemically, as the double linkages still present react with oxygen and give rise to a multi dimensional polymerization. This process can be controlled by driers or inhibitors.

### Action of Drying Agents (Driers) With Silicone Resins

*By Dr. Krauss.*

The author first surveyed briefly the structure of the silicone resins, their characteristics and their application range. The practical application in recent times in the electrical field for insulation purposes and in the finish industry as temperature resistant insulation materials of the silicone resins as is known, is rendered difficult by their long hardening-out times. Endeavors have been made accordingly to control in a more favorable manner the stoving conditions of the silicone finishes by the addition of various catalyzers such as amines, metal complexes and soluble metal salts. With this however one has always to reckon on a shortened storage life of the resin solutions and in many cases, a reduced temperature resistance.

There was investigated the connections between the hardening acceleration and the influencing of the standing (storage) time and the temperature stability. It was found with this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research that lead salts are the most active addition agents in this connection. It is necessary to use caution with the employment of these lead salts because in a short time a very strong embrittlement of the films occurs. Of the two alternatives, it is obviously preferable to have a lesser catalyzing effect rather than a subsequent embrittlement.

The author then discussed the effect of various catalyzers and mentioned, among other things, the introduction of various amines as hardening accelerators, which for practical purposes are less suitable because of the unpleasant smell and the tendency towards yellowing. On the basis of the results obtained with these investigations, details were given of catalyzer mixtures between what are termed the strong hardening accelerators as for example, lead, calcium, aluminium, and what are termed the weak hardening accelerators, zinc, titanium, cobalt, and iron, which cause a very rapid hardening-out of the silicone resins, but which also even improve the temperature resistance and only influence to a small extent, the standing (storage) characteristics of the resin solutions. With this, the weak acting metals must be present in excess.

With pigmented silicone lacquers, it was found by the author that the pigment used acted as a weak-acting hardening accelerator. The best combinations were found to be mixtures of 0.05—1 part of lead naphthenate and 1—3 parts of zinc naphthenate to 100 parts of solid bonding medium. The action and advantages of this and similar hardener combinations were illustrated by a number of examples.

In the discussion some further experiences of the addition of driers to silicone resin finishes were given. It is specially important with this to consider also other co-operating factors. Thus, the characteristics of the subsurface have considerable influence on the action of driers with the silicone lacquers. There was given, as an example, defects which were encountered with the lacquering of phosphated steel sheet.

### Importance of Electrical Charges of Pigments

*By G. Florus.*

The author discussed the comprehensive electrophoretic measurements which were conducted on pigments, which were rubbed down in the filming mediums and solvent mediums. With this research work it could be established that the inorganic pigment particles are positively or negatively charged or are electrically neutral according to the boundary surface activity of the suspension medium while the organic pigments carry a self-characteristic electric charging, i.e. an electrical charge independent of the suspension medium.

There were then discussed the possibilities of influencing the electrical charging of pigment particles and by means of some suitably assembled examples it was demonstrated how there can be exerted with inorganic pigments a favorable influence on the electrical charging by suitable choice and combination of the bonding (film-forming) medium or by additions of wetting agents or flow agents. This is not possible with organic pigments. The author indicated further that certain bonding mediums can act as wetting agents.

Subsequently, there was discussed in detail the somewhat characteristic behaviors of zinc white pigments. Finally, various examples of application-technico characteristics such as settling-out (sedimentation) phenomena, flow, gloss, and structural viscosity, compared with the findings of electrophorus. It was indicated that the stability of a dispersion, the degree of dispersion and with this also the above-mentioned characteristics are associated narrowly with the electrical charging of the pigment particles but, that the influences of varying processing methods must likewise be considered. After these discussions on the influence on the electrical loading of the pigments on the application-technico characteristics, it was finally indicated that the particle electrical loading charge in the opinion of the author is no universal remedy for finish defects but that its influence should not, however, be under-rated. In the discussion it was stated that further investigations on this subject should be conducted with special attention to the disperse phases of organo-sols.

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## CATHODIC PROTECTION

(*From page 30*)

This investigator also observed a minimum of resistivity in the relationship between zinc dust concentration in the film and conductivity although he found it to lie at a slightly higher zinc dust concentration.

That good electrical contact between zinc-rich films and the metallic substrate is established was demonstrated by *J. E. O. Mayne* (13) by measuring the potential versus the calomel electrode of steel panels coated with various metallic pigment paints. He reasoned that the electrode potential of a steel panel will be that of the metallic pigment in the coating if the pigment is in contact with the steel provided that there is a good electrolytic conductor. If metallic contact does not exist, the potential of the substrate will be that of the uncoated panel. His results are shown in Table 2.

The practical usefulness of this approach is suggested by exposure tests with zinc-rich paints conducted especially by *U. R. Evans* and his school in England (2,13,15,-16,17). To date, zinc-rich paints have been tested largely under conditions of immersion and not in conjunction with cathodic protection. They seem to offer inherent advantages over other metal protective coatings in this latter application that they are believed to be worthy of exhaustive examination. However, extensive laboratory and practical service testing will be necessary before entirely reliable coatings for use with cathodic protection can be developed on this or a similar basis.

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•

### Linseed Oil Agents

Minnesota Linseed Oil Co. has announced the following appointments as representatives for the sale of its linseed oils:

John H. Calo Co., Inc., 19 Rector St., New York City, to serve the New York metropolitan area; Van Horn, Metz & Co., Inc., 241 E. Elm St., Conshohocken, Pa., to serve the area around Pennsylvania, and Baker & Collinson, 12000 Mt. Elliott Ave., Detroit, to serve the Detroit area.

•

### Furniture Finishing

Latest developments in furniture finishing will be given at the seventh annual furniture finishing short course Aug. 27-31 at North Carolina State College.

Among the topics to be covered will be airless spraying, multicolored coatings, and color-masking toners. Other special features include reduction of overspray, hot-lacquer coatings, finish repair or touch up, and reduction of defects.

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# TECHNICAL Bulletins

### AEC REPORTS

Atomic Energy Commission technical reports recently released to the public through the agency's accelerated declassification and release program are listed in eight free price lists available from the Office of Technical Services, U. S. Department of Commerce, Washington, D. C., sales agency for AEC reports.

These lists are TID-1901, TID-1902, TID-1903, TID-1904, TID-1905, TID-1906, TID-1907, and TID-1908. Another free price list, Price List No. 25, lists all AEC reports available in printed form from the Office of Technical Services up to Dec. 24, 1955.

### ENGINEERED DRYING

Bulletin K-156, a two-color brochure, describes new 'Surface' high speed, low-temperature dryers for continuous drying processes. It explains how continuous dryers replace batch operation in production of glue and gelatin dairy products, chemicals, foods, pharmaceuticals, pigments, synthetic yarns, varnishes, etc. Available from Air Conditioning and Drying Division, Surface Combustion Corp., Dept. PVP, 2375 Dorr St., Toledo 1, Ohio.

### PACKAGE TESTING

The importance and procedure of pre-testing corrugated boxes is fully discussed in a revised edition of "How To Test Corrugated Boxes" recently published by Hinde & Dauch, Dept. PVP, Sandusky, Ohio.

The 24-page booklet—Number 11 in the H&D Little Packaging Library Series—describes and illustrates the various tests which assure ample product protection in corrugated packaging and includes a quality check chart for appraising the efficiency of corrugated boxes. It also contains information on existing carrier regulations as they apply to the shipment of corrugated-packaged products.

### LEAD IN PAINTS

The Scientific Section, National Paint, Varnish and Lacquer Association, Dept. PVP, Washington 5, D.C., has published "Determination of Lead in Paints at the One Per Cent Level," by M. W. Westgate, R. B. Shurts and E. F. Adams.

This circular, No. 773, consists of two parts. The first reports the results of cooperative determinations of small percentages of lead in paint. The second part describes improvements in the determination of lead in paint where organic matter must be destroyed. This improvement consists in the destruction of the organic matter with Caro's acid.

### SHIPPING BOXES

A new, revised edition of the Little Packaging Library Booklet, "How To Seal Corrugated Shipping Boxes," has been published by Hinde & Dauch, Dept. PVP, Sandusky, Ohio.

Subject matter in this 24-page publication outlines procedures recommended to cut losses, reduce waste, speed up and simplify sealing methods. Both hand and automatic sealing procedures are discussed including application of adhesives, gummed and pressure-sensitive tape, stitches, staples and steel bands. Sealing procedures recommended for both regular slotted boxes and specialized box styles are also fully explained and illustrated in the booklet.


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### DISTILLATION APPARATUS

Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill., has published Bulletin 730 illustrating and describing the Precision Automatic Distillation apparatus for automatic distillations of products having a boiling range between 90° and 700° F.

The eight-page bulletin describes uses—such as A.S.T.M. D 86—and features of the apparatus—including accuracy of better than −1° F. and 0.1 ml., repeatability of 1.085° F., automatic recording of temperature, volume and time, and ease of operation. Also included are all close-up views of the component parts, a functional block diagram of the apparatus and typical distillation curves produced by the A.D.A.

### SAFETY CLEANOUT VALVE

A six-page bulletin on its Safety Cleanout Valve for use on buried tank installations for storage of volatile, inflammable liquids is available from Petrometer Corp., 43-22 10 St., Long Island Citys N.Y. Widely used for many year' on gasoline storage systems, the valves have been found to be equally successful on process industry installations providing safe easy access to tank bottoms for removal of water and sludge, according to the bulletin.

### PALLET DOLLIES

A new bulletin on light-weight pallet dollies provides information on models, sizes, load capacities, construction features and other pertinent data. The dollies are of magnesium construction, and fourteen standard sizes are available. Copies available from Magline Inc., 1900 Mercer St., Pinconning, Mich.

### METERING PUMP DETAILS

The text and illustrations of a recent talk given before the Instrument Society of America on factors governing accuracy in controlled volume pumping are available in a bound technical paper from Milton Roy Company. Test procedures and results of how separate investigations into metering accuracy are recorded. The paper describes and illustrates how controlled volume pumps, because of their high volumetric efficiency and accuracy, are used as flow control instruments in both open and closed loop instrumentation systems. Copies of technical paper No. 65 are available from Milton Roy Co., Station M, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

### CANNED MOTOR PUMPS

Bulletin 1040 describes and illustrates construction and operation of high temperature Series T canned motor Chempumps. These new units are designed for leak-proof pumping of such fluids as Dowtherm, Arochlor, Para-Cymene and others at temperatures to 1000° F. Full details on performance, materials of construction, dimensions, power requirements and other specifications are given. Available from Chempump Corp., Station L, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

### MICA AS LATEX EXTENDER

Technical Bulletin No. 24, "A Supplementary Report on the Pres-


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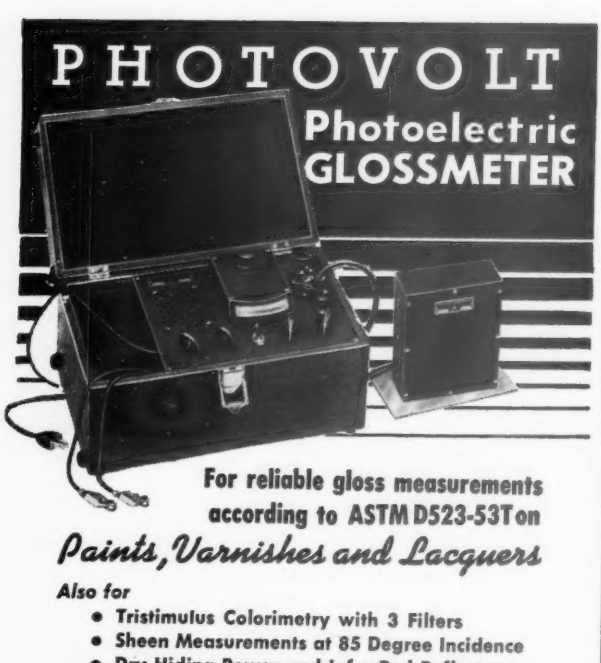

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ent Use of Wet Ground Mica as an Extender in Latex Paints" has been published by the Wet Ground Mica Association, Inc., Dept. PVP, 420 Lexington Ave., New York 17, N. Y. This publication is a supplement to Technical Bulletin No. 22 and contains additional formulas for latex paints using wet ground mica as an extender. The new bulletin contains formulas recommended by three additional latex manufacturers.

### AEROSOL INDUSTRY TERMS

The Chemical Specialties Manufacturers Association, Dept. PVP, 50 E. 41 St., New York 17, N. Y., has published a three-page bulletin, No. 105-56, entitled, "Glossary of Terms Used in the Aerosol Industry (Tentative)." The glossary was reported by the Definitions and Terms as Applied to Aerosols Sub Committee, Aerosol Division, April 25; Adopted Scientific Committee, May 20; Accepted Aerosol Administrative Committee May 20.

### REPORT OF COMMITTEE D-1

The report of Committee D-1 on Paint, Varnish, Lacquer and Related Products, presented at the 59 annual meeting of the American Society for Testing Materials recently held in Atlantic City, N. J., is now available in booklet form from the Scciety at Dept. PVP, 1916 Race St., Philadelphia 3, Pa. The booklet runs to 79 pages.

### HOT SPRAY

The DeVilbiss Co., Dept. PVP, 296 Phillips Ave., Toledo 1, Ohio. has issued a booklet describing its hot spray system. The booklet deals with the reasons the user benefits from the use of DeVilbiss hot spray method, the reasons behind the advantages of the hot spray method, how the method assures the best results, and the flexibility of the company's hot spray systems for all installations.

### GREEN TONERS

Zinsser & Co., Inc., a subsidiary of The Harshaw Chemical Co., Dept. PVP, 1933 E. 97 St., Cleveland 6, Ohio, has issued a folder on its "Crotonfast" Green Toner 4D-3600 and Green Y Toner 4D-3350 paints, enamels, lacquer, inks, plastics, and rubber. General data as well as color charts are included.

### MATERIAL HANDLING PUMPS

Bulletin PP-56 discusses the company's new material handling pumps for high volume, continuous operation primarily on maintenance painting, production finishing and coating applications. Bulletin is available from M & E Manufacturing Co., Dept. PVP, 2571 Winthrop Ave., Indianapolis 7, Ind.

### WEIGHT PER GALLON CUPS

Gardner Laboratory, Inc., Dept. PVP, Bethesda 14, Md., has published Bulletin No. 146 on its weight per gallon cups. The bulletin describes seven cups, including regular and paste types. These cups are for the measurement of specific gravity of solids, as well as specific gravity and weight per gallon of liquids and pastes.


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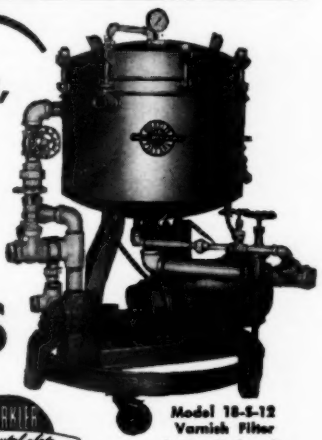

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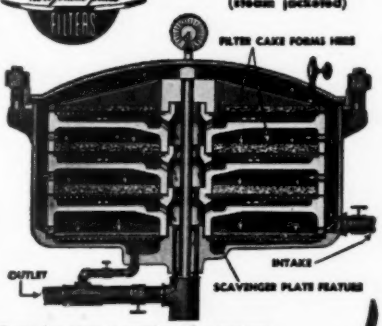


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## FATTY ACIDS

(*From page 33*)

are becoming of more interest in the coatings field.

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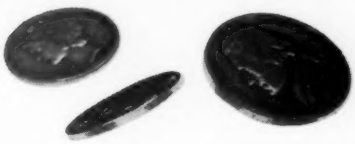

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*Dramatic proof of the high density of AZODOX as compared with AZO-ZZZ paint grade zinc oxides which, themselves, are more dense than conventional zinc oxides.*

# AZODOX

## DE-AERATED ZINC OXIDE

**AZODOX** is the result of a manufacturing process new to the zinc oxide industry. Here, at last, is a zinc oxide with all the desirable qualities of AZO-ZZZ, American Process, paint grade zinc oxides—plus time-saving, labor-saving and money-saving advantages that no other form of zinc oxide possesses to the same degree. Samples and test lots of factory proved AZODOX now available for you. *There is no increase in price over conventional zinc oxide.*

### HERE'S WHY AZODOX IS BEST FOR YOU

**Twice the Density, Half the Bulk.** AZODOX cuts storage space in half. Despite high density, perfect texture of material is unchanged. AZODOX package is shaped, permitting close-packed, well-formed unitized shipments.

**Increased Mixing Capacity.** AZODOX incorporates readily in oil, disperses completely. Its high density, low bulk gives greater capacity, steps up production of both mixers and mills.

**Flows More Freely, Less Dusting** than conventional zinc oxides.

**Physical Properties Unchanged Except for Density.** Consistency, particle size and shape, color and all other physical properties *except apparent density* are unaltered. And *all* chemical properties are unchanged.

**Azodox Cuts Your Costs.** Faster handling, easier storing, quicker mixing save you money.

American Zinc sales company

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